



## **SECOND REPORT**

ON

# **Intensive Agricultural District Programme**

**1960—65**

**EXPERT COMMITTEE ON ASSESSMENT AND EVALUATION  
MINISTRY OF FOOD, AGRICULTURE,  
COMMUNITY DEVELOPMENT AND COOPERATION  
(DEPARTMENT OF AGRICULTURE)  
GOVERNMENT OF INDIA**



सत्यमेव जयते

## II. DISTRICT REPORTS

### A : GROUP I DISTRICTS



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## P R E F A C E

The Intensive Agricultural District Programme (IADP or Package Programme) was undertaken initially in 1960-61 for a five-year period, with the objective of achieving a rapid increase in agricultural production through an integrated and intensive use of improved agricultural techniques and providing sufficient production incentives to the farmers. Districts selected for this programme were to be those with a maximum of irrigation facilities and a minimum of natural hazards.

The programme was established in two stages; in seven districts beginning nominally in 1960-61 but really in 1961-62 with support from the Ford Foundation and in eight districts beginning in 1962-63 following the pattern of the first group. The districts in the first group are Thanjavur, West Godavari, Shahabad, Raipur, Aligarh, Ludhiana and Pali. Those in the second group are Alleppey, Palghat, Mandya, Surat, Sam-balpur, Burdwan, Bhandara and Cachar. The programme was also started in six blocks in Jammu & Kashmir but no progress worth the name had been made in these blocks.

This is the Second Evaluation Report on the progress of the Intensive Agricultural District Programme and covers the work in all the fifteen districts mentioned above for the five year period—1960-61 to 1964-65. The First Evaluation Report issued in November, 1963 covered the progress only in the first group of seven districts upto 1962-63.

The structure of the present report broadly follows the same pattern that was adopted in the first report. The report has been divided into three parts. The first part gives certain general information about the background and progress of the programme. The second part gives a detailed account of progress in each of the fifteen districts based on the results of agronomic, agro-economic and crop-cutting surveys conducted in these districts. Certain background information in regard to the first group of seven districts which has already been given in the first report has not, however, been repeated in the present report. In the third part which is called "Progress and Prospects", an attempt has been made to summarise the main conclusions. A brief mention is made in the following paragraphs of some of the more important points made in this part.

The IADP districts may be viewed as the first tier in a three tier system for the development of agriculture in the country. The second tier comprises the other districts in the country having a potential for rapid development, but limited by the availability of the requisite inputs and

personnel. These are called the IAA (Intensive Agricultural Area) Districts. The third tier includes all other districts in the country. In this three-tier concept, the vanguard comprises the IADP districts which are supposed to serve as "path-finders" and "pace-setters".

Although the period covered in this report is five years (including 1960-61), if allowance is made for the time required for preparatory arrangements, the maximum period for which the programme has been effectively in operation in any district is only three and half years. In many districts it has been much less. This is considered, by all standards, too short a period for any definitive evaluation of a programme of this nature, particularly in view of weather variations such as the monsoon failure of 1965. The conclusions of this report should, therefore, be considered as only tentative.

Surveys undertaken at the instance of the Committee show that a majority of the farmers in the districts as a whole are already participating in the programme; total production as well as yield per hectare of foodgrains have gone up and the demand for inputs such as fertilizers has exceeded the supply.

Participation in individual farm plans is one indication of farmer participation in the IAD Programme. In the fifteen districts 2.06 lakh farm plans were prepared in 1961-62; this had risen to 11.34 lakhs in 1964-65. It is estimated that per block participation in the first group of seven districts rose from 1835 in 1961-62 to 4800 in 1964-65 and in the second group, from 1715 in 1962-63 to 3215 in 1964-65. These compare with an average of 9535 farmers per block of which about 5,700 hold a hectare or more.

Although the programme began with only about a fifth of the blocks in each district and has only in its last years covered the bulk of the area of each district, its impact is reflected in both higher total average production and yield rates during the programme period. The increase in production is largely due to increase in yield per hectare. The report shows that for the first seven districts, total foodgrains production in every district averaged markedly higher than in the pre-programme period and also higher than in adjoining districts, though there was considerable variation in the rate of increase of production as between districts. For the second eight districts which were taken up later and hence had a shorter experience of the programme, the average increases for the shorter period were naturally lower by comparison. On the whole, the benefit-cost ratio has been substantially high in favour of the programme.

There has been a sharp increase in the demand of the farmers for purchased inputs like chemical fertilisers and improved seeds. The total distribution of nitrogenous fertilizers (in terms of ammonium sulphate)

increased from 89,000 tonnes in 1961-62 to 196,000 tonnes in 1964-65 in the first seven districts. In the second eight districts it went up from 67,000 tonnes in 1962-63 to 108,000 tonnes by 1964-65. The rate of increase of fertilizer consumption in the first seven districts is roughly 2½ to 3 times than in non-IADP districts.

In the field of credit, there has been considerable increase in membership, paid-up capital, etc. of cooperatives. But surveys show that more than three-fourths of borrowings are still made from the traditional money-lenders. The record of these cooperatives in regard to collection of over-dues and attracting deposits has been rather disappointing.

On the whole, the experience of the programme so far has shown that the basic concept of the IADP is essentially sound but that success would depend upon the extent to which the main components of the programme viz., (i) sound technical guidance from extension personnel which is adequate in strength as well as in competence to motivate farmers to change from traditional thinking and farming practices to new technology; (ii) production requisites; (iii) credit; (iv) remunerative prices; and (v) administrative machinery geared to accept as well as accelerate change, are brought together in an effective "package".

IADP has established beyond doubt that the Indian farmer, in spite of his illiteracy and poverty, is not un-intelligent or unduly tradition bound. Once he is convinced that a particular innovation is both useful and within his means, he is as prompt as farmers in other parts of the world to accept it.

The IADP has also proved that the small farmer can be no less progressive than the big farmer. There are several areas within certain IADP districts where the increase in production would compare favourably with the record of areas of similar size in most other countries.

On the other hand, experience has also shown that the rather archaic administrative system that obtains in the country has proved to be the most serious obstacle to the IADP. This administrative system, based essentially on checks and balances, evolved in a different time and for a different purpose, is more procedure-oriented than action-oriented and has proved woefully inadequate for any operation, the aim of which is not to maintain the *status quo* but to change it.

Another lesson to be drawn is that the Government's basic policies regarding credit, marketing, prices, industries, import, investment and land have not always been conducive to the full realisation of the benefits of an intensive programme of this kind.

Although progress of the IADP has been encouraging on the whole, much remains to be done to attain a more rapid rate of development at the

district level. The problem lies mainly in four areas: (i) providing a better over-all economic climate to encourage farmers; (ii) strengthening and stabilizing the staff situation in the district and rationalising procedures; (iii) improving the supply situation; and (iv) speeding up the development of high-yielding varieties of all major crops.

A significant conclusion of the report is that the full impact of the IADP is likely to take a much longer time than the five years contemplated in the original formulation of the programme.

Nine members of the Committee, *viz.*, Dr. V.G. Panse, Dr. J.P. Bhattacharjee, Mr. H.A. Miles, Shri Y.N. Varma, Shri S.C. Chaudhri, Shri P.D. Kasbekar, Dr. David Hopper, Dr. Donald D. Steward, and Shri P.S. Sahota, have left since the last report was submitted. Dr. V.G. Panse, in the capacity of Member-Secretary of the Committee and Chairman of the Sub-Committee on Benchmark Survey and Assessment, had been mainly responsible for organising the work of the Committee and undertaking a large number of technical studies. Dr. J.P. Bhattacharjee, as the Chairman of the Sub-Committee on Operational and Analytical Studies, was responsible for considerable pioneering work. Mr. H.A. Miles, as the Leader of the Ford Foundation Team, gave most valuable advice and help to the Committee. I would like to take this opportunity to express my own gratitude and that of the other members of the Committee to all of them.

Like the earlier report, the present report has also been the result of the cooperative effort of a large number of official and non-official experts, including those from the Institute of Agricultural Research Statistics, Directorate of Extension and Directorate of Economics & Statistics, Ministry of Food & Agriculture, Reserve Bank of India, the State Governments and the Agro-Economic Research Centres located at Delhi, Santiniketan, Jorhat, Vallabh Vidyanagar and Madras. I would like to take this opportunity to express the gratitude of the Committee to all of them. Special mention may be made of the assistance given by Dr. Daroga Singh of the Institute of Agricultural Research Statistics, Dr. M.P. Singh and Dr. T.R. Mehta of the Directorate of Extension, Shri R. Giri of the Directorate of Economics & Statistics and Shri K.L. Anand of the Reserve Bank of India. I would like also to express my appreciation of the good work done by the various officers who worked for the Committee, especially Sarva Shri K.S. Krishnan, S.S. Narula, P.N. Bhargava and T.C.M. Menon of the Institute of Agricultural Research Statistics and Sarva Shri S.C. Tripathi, P.D. Srivastava and James Kurian of the Directorate of Extension.

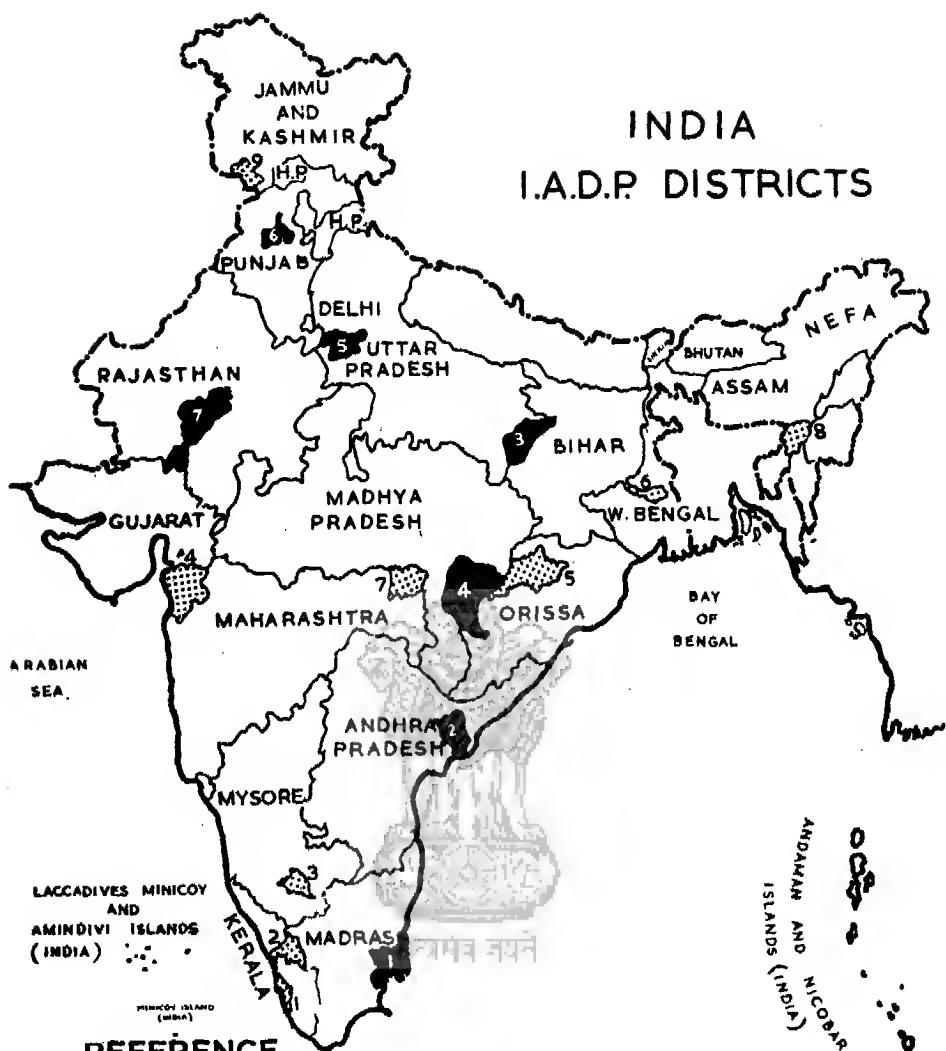
S.R. SEN  
*Chairman*

Expert Committee on Assessment and Evaluation  
of the Intensive Agricultural District Programme.  
April 20, 1966

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3. Dr. G.R. Seth, (upto 20-3-62 and from 11-1-66) Member-Secretary  
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## REFERENCE

— External Boundary of India

~ State Boundaries

■ First Seven I.A.D.P. Districts

S.NO.	DISTRICTS	STATES
1	THANJAVUR	MADRAS
2	WEST GODAVARI	ANDHRA PRADESH
3	SHAHABAD	BIHAR
4	RAIPUR	MADHYA PRADESH
5	ALIGARH	UTTAR PRADESH
	LUDHIANA	PUNJAB
	PALI - SIROHI	RAJASTHAN

● ADDITIONAL I.A.D.P. DISTRICTS

S.NO.	DISTRICTS	STATES
1 - 2	ALLEPPEY, PALGHAT	KERALA
3	MANDYA	MYSORE
4	SURAT	GUJARAT
5	SAMBALPUR	ORISSA
6	BURDWAN	WEST BENGAL
7	BHANDARA	MAHARASHTRA
8	CACHAR	ASSAM
9	6 BLOCKS	JAMMU AND KASHMIR

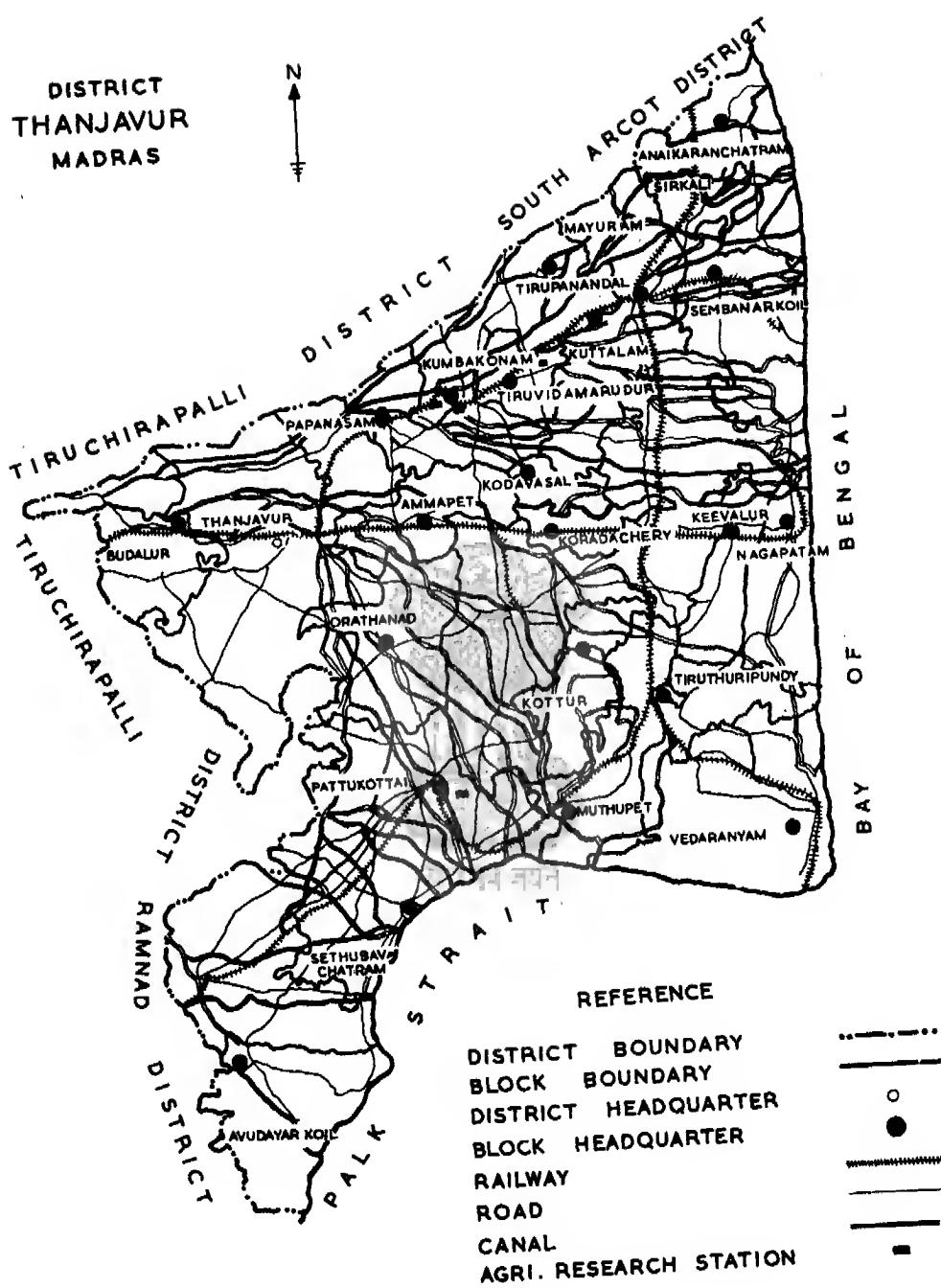


I. GENERAL

नियमित नियन्ते

**B : GROUP II DISTRICTS**





## CHAPTER I

### INTRODUCTORY

The first report on the progress of the Intensive Agricultural District Programme (IADP and also popularly known as the Package Programme) brought out in November, 1963 covered the first two years of the implementation of the scheme *viz.*, 1961-62 and 1962-63. It dealt with the progress in respect of those seven districts where the IADP was taken up in the first instance. The districts covered by the report were Thanjavur (Madras), West Godavari (Andhra Pradesh), Shahabad (Bihar), Raipur (Madhya Pradesh), Aligarh (Uttar Pradesh), Ludhiana (Punjab) and Pali (Rajasthan).

1.2 At the time when the IADP was formulated, it was agreed to start it on a "pilot" basis in these seven districts and observe its impact on agricultural production. Subsequently, however, it was considered desirable to extend its coverage and try out the approach in one district of each of the remaining States as well. Accordingly, the State Governments selected the districts in consultation with the Government of India on the basis of the following criteria :

- (a) availability of assured water supply over large areas;
- (b) minimum of natural hazards such as floods, drainage problems, acute soil conservation problems; etc.,
- (c) existence of well-developed village institutions like cooperatives and panchayats; and
- (d) maximum potentialities for increasing agricultural production within a comparatively short time.

The districts so selected were Alleppey and Palghat (Kerala), Bhandara (Maharashtra), Burdwan (West Bengal), Cachar (Assam), Mandya (Mysore), Sambalpur (Orissa), Surat (Gujarat) and six blocks in Jammu and Anantnag districts (Jammu & Kashmir).

1.3 The first report on the progress of the IADP did not deal with the second group of districts as most of them entered the "operational" phase of the programme only in 1962-63, while others were still engaged in the "preparatory" phase of laying the groundwork and completing such arrangements as the selection and recruitment of staff, their training, organising the supply line, strengthening the village institutions, specially cooperatives, conducting the bench-mark survey for collecting the base-line data, etc.

1.4 In the first seven districts, the programme is being implemented with the financial and technical assistance of the Ford Foundation. In the second group of districts no such external assistance is available. However, in view of the decision of the Government of India that all the selected districts should be treated alike, it was decided to implement the package programme in these districts on the same pattern and intensity as in the first seven districts. A logical corollary was that the financial commitments of the Ford Foundation in the first seven districts had to be assumed by the Government of India in the second group of districts, in addition to their own contribution. The financial liability of the State Governments in the sharing of cost on the implementation of the programme was, thus, restricted to the limit accepted in respect of the first seven districts. To mention briefly, the Government of India meets the entire cost on all the items of the programme, except the additional staff on which they bear 75 per cent of the expenditure involved, 25 per cent being the share of the State Government. So far as the technical assistance is concerned, the Ford Foundation are assisting the second group of districts also through their experts in the same manner as they are doing in the first group.

1.5 The concept, objectives and content of the IADP have been spelt out in detail in the earlier progress report. Briefly re-stated, the programme is meant to demonstrate the potentialities of increasing food production through a multi-pronged, concentrated and coordinated approach to agricultural development in areas which can quickly respond to such production-efforts. The programme not only involves adoption by cultivators of a "package of improved practices", such as, improved seeds, fertilizers, pesticides, improved implements, proper soil and water management, etc. but also provision of a "package of services" consisting of competent technical staff, availability of credit and production supplies, land and water improvement, adequate research information for basing extension recommendations thereon, storage and marketing and price assurance which will enable the cultivator to adopt scientific methods of farming.

1.6 The programme has the four-fold objective of

- (a) determining how rapid increases in food production could be achieved so as to provide experience for adoption in other areas;
- (b) increasing the income of the cultivator and his family;
- (c) helping to improve the economic resources of the village; and
- (d) providing an adequate agricultural base for more rapid economic development and social betterment.

1.7 Under the programme, an intensive effort is being made to reach all farmers through the available village institutions like cooperatives and panchayats and to formulate farm and village production plans which

will progressively involve all agricultural families. In the selected districts, an attempt is being made to saturate the entire cultivated area with improved varieties of seeds, use of fertilizers, adoption of improved agricultural practices, soil and water conservation, use of improved agricultural implements, plant protection measures, etc. The total requirements of inputs are to be made available in time and at places within easy reach of the farmers. Additional flow of credit is being stimulated so that the demands for short-term loans at least of all cultivators participating in the programme could be met.



## CHAPTER II

### BASIC FEATURES OF THE DISTRICTS SELECTED AND COVERAGE OF THE PROGRAMME

#### *Basic features :*

2.1 By the end of 1964-65, the first seven districts have completed about four years of field operation of the IADP. So far as the second group of districts is concerned, they were, like the first seven districts, at varying levels of agricultural and cooperative development at the time of selection and could not naturally complete the various preparatory measures simultaneously. Consequently they entered the execution and operational stage of the programme at different times. The districts of Alleppey and Palghat, Mandya, Surat, and Sambalpur launched the programme in the kharif season of 1962-63 and have completed three years of implementation by the end of 1964-65. This was followed by the district of Burdwan where the programme was taken up in the rabi season of 1962-63. Bhandara and Cachar districts could initiate the programme in the field only in the kharif of 1963-64 as their final selection took a little longer time. So far as Jammu and Anantnag are concerned, the State Government have taken unduly long time in completing the various preparatory arrangements like the selection, recruitment and training of staff and in creating the various supporting institutions like implements workshop, information unit, etc. During 1964-65, however, a small beginning was made in the direction of implementing the programme, but it is not likely to make much headway unless the Department of Agriculture is fully involved in the programme.

2.2 The following table shows some of the relevant data like the total number of blocks and villages, the cultivated and irrigated area and population of the IADP districts.

	No. of blocks	No. of villages	Gross cropped area (lakh hect.)	Irrigated area (gross) (lakh hect.)	Total popula- tion (million)
Ist group of districts	141	14,120	45.09	18.79	12.29
2nd group of districts	173	13,707	35.71	7.85	13.83
Total	314	27,827	80.80	26.64	26.12

It will be observed that the IADP districts together account for 314 C.D. blocks out of the total number of 5240 blocks in which the country is divided. The gross cropped area of these districts is about 81 lakh hectares which forms a little over 5 percent of the total cultivated area in the country. The district-wise details are shown in the statement at Annexure I.

**2.3** The basic features of the first seven districts have been discussed in the earlier progress report. To recapitulate, four out of seven are predominantly rice-growing, namely, Thanjavur (Madras), West Godavari (Andhra Pradesh), Raipur (Madhya Pradesh), and Shahabad (Bihar); two are wheat-growing viz., Aligarh (U.P.) and Ludhiana (Punjab), while Pali (Rajasthan) has pre-ponderance of millets and wheat.

**2.4** In the second group of districts, namely, Alleppey, Bhandara, Burdwan, Cachar, Mandya, Palghat, Sambalpur, Surat and six blocks in Jammu and Anantnag, rice is the principal crop. The district of Mandya has sizable area under ragi and sugarcane. In the district of Surat, jowar and cotton occupy considerable area. With regard to the facilities of assured irrigation, in Burdwan, 52 percent of the gross cropped area is irrigated. In the other districts, however, the intensity of irrigation is comparatively low and varies from 3 to 36 percent although this deficiency is made up, to some extent, by high rainfall. In the districts of Alleppey, Palghat and Cachar, the average rainfall in a year is around 300 cm.; in Sambalpur it is 157 cm. and in Bhandara 140 cm. The six selected blocks in Jammu and Anantnag have a very high intensity of irrigation, the irrigated area being as much as 61 per cent of the gross cropped area. The yield levels in these districts are low and range between 10 quintals to 20 quintals per hectare so far as the principal crop of rice is concerned.

#### *Coverage of the programme:*

**2.5** Experience has shown that any scheme like the package programme which involves new concepts, new techniques and procedures can progress as fast as it can draw the cultivators into its fold. It depends upon a number of factors such as the preparedness of village institutions like panchayats and cooperatives to shoulder the increased responsibilities flowing from the programme and the general awareness and response from the cultivators. The education of farmers is a gradual process. In the very nature of things, therefore, the process of extension of the scope of the programme is bound to be slow in the initial stages. In fact, the State Governments were advised to proceed carefully during the first two to three years in order to produce an impressive demonstration effect so that the coverage of the programme could increase at a faster rate in the subsequent years.

2.6 In the first seven districts, the pace of coverage was somewhat slow upto the end of 1962-63, which was the second year of operation of the IADP. The subsequent years viz. 1963-64, and 1964-65, however, witnessed substantial expansion in the coverage and now the programme extends to all the 141 blocks (132 on account of redelimitation of blocks in West Godavari district) and to 12426 villages out of the total number of 14,120 villages in these districts. The area covered by farm plans rose from 10.23 lakh hectares in 1962-63 to 13.74 lakh hectares in 1963-64 and to 17.95 lakh hectares in 1964-65, forming about 40 per cent of the gross cropped area of the districts.

2.7 Among the second group of districts, the programme was initiated in 79 blocks out of the total number of 167 blocks (excluding the 6 blocks in Jammu and Anantnag where the programme had not made any headway) during 1962-63. The scope of operation was enlarged to 118 blocks during 1963-64 and further to 142 blocks during 1964-65. Out of the total 13,707 villages in these districts, nearly 9603 villages were covered by the year 1964-65. The coverage in terms of gross cropped area during 1962-63 amounted to 2.90 lakh hectares which was almost doubled to 5.54 lakh hectares in 1963-64. The steady pace of coverage was maintained in 1964-65 when the gross cropped area covered increased further to 8.38 lakh hectares which was 24 percent of the total gross cropped area in these districts.

2.8 The percentage of cultivating families brought within the fold of the programme among the first seven districts during 1964-65 varied within a wide range from 86 per cent in Ludhiana to 41 per cent in Raipur. In the remaining districts also such wide variations were observed. Among these districts Palghat ranked highest having covered 70 per cent of farm families during 1964-65 and Cachar the lowest where only to 10 per cent of farm families were covered.

2.9 The rate of progress with regard to coverage of area was also not uniform in these districts. This was natural since, as mentioned earlier, the districts were at varying levels of agricultural and cooperative development at the time of selection. Among the first seven districts, the total gross cropped area covered by the programme by 1964-65 was the highest *i.e.*, 84 percent in West Godavari district and the lowest, *i.e.*, 22 percent in Raipur district. In the case of remaining eight districts, while Alleppey ranked the highest with nearly 59 per cent of the gross cropped area brought under the programme, Sambalpur ranked the lowest, the coverage of area being only 7 per cent. The table given below indicates the percentage of gross cropped area covered under the programme during 1964-65 in both the groups of IADP districts.

<i>First Group</i>		<i>Second Group</i>	
<i>District</i>	<i>Percentage of gross cropped area covered</i>	<i>District</i>	<i>Percentage of gross cropped area covered</i>
1. Thanjavur	61.4	1. Alleppey	58.8
2. West Godavari	83.7	2. Palghat	57.5
3. Shahabad	26.2	3. Mandya	35.1
4. Raipur	22.0	4. Surat	29.7
5. Aligarh	31.3	5. Sambalpur	7.2
6. Ludhiana	52.8	6. Burdwan	16.5
7. Pali	23.6	7. Bhandara	8.5
		8. Cachar	10.0



## CHAPTER III

### ADMINISTRATION AND TRAINING

#### *Administration :*

3.1 The normal staff in the districts selected for the IADP has been strengthened, both at the district and block levels, in order to provide effective technical guidance and assistance to the cultivators in the adoption of improved methods of farming and to ensure close supervision over the utilization of resources. The general pattern of additional staff, over and above the normal complement of community development staff provided at the district level, includes one Project Officer, one Assistant Project Officer, 3-4 Subject-matter Specialists and one Assistant/Deputy Registrar of Cooperative Societies. At the block level the additional staff consists of 10 VLWs, upto 4 Extension Officers (Agri.), one Extension Officer (Coop.), and 4-5 Cooperative Supervisors. Within the framework of this staffing pattern, the actual additional staff in position differs from district to district, depending on the existing administrative set-up and the local situation.

3.2 The details of staff in position in the first seven districts have been given in the earlier progress report. In the remaining districts also, although the selection and posting of staff took a long time owing to the usual administrative delays in issuing sanctions by the State Governments and the procedural formalities involved in recruitment through the Public Service Commissions, the full complement of staff was in position during 1962-63, both at the district and block levels. Some of the districts like Mandya, Alleppey, Palghat and Sambalpur were particularly handicapped in getting the full complement of VLWs on the sanctioned scale. In most of the areas, either inadequately trained VLWs or those who had just come out of the training centres had, therefore, been posted to overcome the shortage. The State Governments were, however, requested to ensure that competent and experienced personnel were posted in the IADP areas which demanded from the field staff a higher level of performance and technical skill.

3.3 One of the serious personnel problems encountered in the IADP districts has been the frequent transfers of staff all along the line from the Collector and the Project Officer down to the VLW. Such transfers have disturbed the stability and continuity of staff which is an essential pre-requisite for the effective implementation of a programme like the IADP. Experience has shown that this need is even more compelling than was initially anticipated. Staff continuity is essential for a number of reasons.

The IADP is a growing and dynamic programme which requires that the staff engaged in its planning and implementation must be familiar with what has gone before and how people have responded to it in order to decide how best to proceed with the next step. Secondly, the existence of wide variations in the conditions determining the success of the programme demands a continued study of and intimate familiarity on the part of the staff with the knowledge and attitude of the cultivators, rates of response to different input factors etc., before they can plan effectively for a given area. A third important reason is the close working relationship that must be developed between the staff and the local people and institutions to make effective extension work possible. Such human relationship takes years to be built up. A recent study of the extent of staff-turnover in 12 out of the 15 IADP districts has revealed the following facts:

(i) *District Collectors and Project Officers:*

3.4 In the case of the District Collectors and the Project Officers the number of individuals occupying the post in the 12 districts from the inception of the IADP upto December 1964 (a period of about 4½ years) is shown below :

<i>In position from inception to December, 1964.</i>	<i>Number of districts</i>	
	<i>Collector</i>	<i>Project Officer</i>
(a) Same individual	0	6
(b) Two different individuals	6	3
(c) Three different individuals	3	3
(d) Four different individuals	3	0

3.5 In the programme set-up, the District Collector is usually the chief administrative officer at the district level responsible for leadership, administrative control and coordination. To play his role effectively he must have a thorough knowledge of the concept and philosophy of the programme, its operation and basic conditions of his district and the people. The longest period during which the programme had been in operation in any of the 12 districts was 54 months, the shortest 24 months and the average 41 months. It will be noticed that no individual had served as Collector the full period in any district. Half of the districts had three or more collectors during this period. The average tenure of a Collector in these districts was about 15 months. This is considered to be too brief a period to enable this key official to understand sufficiently well the complexities of the programme in the district to provide the most effective administrative leadership and guidance.

3.6 More than any other single person, the Project Officer, who is responsible both for planning the programme on an annual basis and for its execution, must understand the district, the people, the problems and his own staff thoroughly to be successful in his work. The tenure-record of Project Officers would seem to be considerably better than that of the Collectors. In half of the districts, the same Project Officer continued to be in position throughout the period. However, one-fourth of the districts had two different Project Officers and the remaining one-fourth had three changes in this short period. Not much programme-continuity is possible under these conditions.

(ii) *Subject-matter Specialists:*

3.7 The situation with respect to the district level Subject-matter Specialists varied considerably from district to district. These Specialists are the key people who must understand the district thoroughly and know how to fit the package of improved practices adequately to local conditions. They have to carry the major share of the heavy load of in-service technical training for Agricultural Extension Officers and VLWs. On an average, a team of 4-5 Subject-matter Specialists in a district has to deal with about 90 Extension Officers and 360 VLWs.

3.8 In the case of Collectors and Project Officers, at least the posts have been kept filled. The same has not been true in the case of Specialists. The analysis of five key specialist positions is shown below as an average of the 12 districts, most of which have almost the same pattern.

Specialist Position	Percentage of time occupied after the position was sanctioned	No. of districts with different individuals filling positions during the period			No. of districts where position was not created
		One person	Two persons	Three persons	
I	2	3	4	5	6
(a) Agronomy or Soils	75	9	1	1	1
(b) Plant Protection	96	7	3	2	0
(c) Farm Management	82	9	1	0	2
(d) Agr. Engineer	64	9	1	1	1
(e) Information	81	10	2	0	0

The post of Plant Protection Specialist seems to have been occupied for most part of the time (96%). However, the turnover of staff has been quite high, three districts having had two individuals in the position at different times and two districts having three or more during the period. The position is quite unsatisfactory so far as the post of Agricultural Engineer is concerned. In the case of the Farm Management position, two of the twelve districts did not have a full-time Specialist which weakened the work relating to farm planning and economic studies of demonstrations and profitability of the recommended practices.

3.9 Experience has shown that regular and repeated in-service training year after year is essential for effective IADP work with cultivators and village cooperatives. When experienced block staff are replaced, not only is the accumulated knowledge and experience lost to the block and district but this change also greatly complicates the problem of effective training. The table below shows the position regarding length of tenure of the different categories of block extension staff as on 31st December 1964 (41 months after the start of the IADP on an average).

Category of staff	<i>Length of service in IADP (as on 31st December 1964), %</i>			
	Less than 1 year	1 to 2 years	2 to 3 years	3 or more years
B.D.O.	27	31	12	30
A.E.O.	27	24	24	25
C.E.O.	23	33	25	19
V.L.W.	10	31	45	14

Except for VLWs, about one-fourth of the block staff were almost new to the IADP work in December 1964 and nearly 30 per cent more had only 1 to 2 years' experience. Only about one-fourth could be regarded as having adequate experience necessary to deliver the goods while the expectation at the beginning of the programme was that almost the entire staff posted in the IADP blocks would be assured continuity to be able to gain an insight into the working of the programme and into the conditions of the areas they had to deal with.

3.10 Failure on the part of the State Governments to maintain a reasonable continuity of staff inspite of repeated requests to do so must be identified as an important operational weakness of the IADP. Frequent staff transfers, particularly at that stage of the programme when there was need for more and more specialized and intensive technical guidance to the cultivators, greatly retarded the progress.

3.11 Added to the problem of transfers was the problem of vacancies. Some of the key posts like that of Subject-matter Specialists remained unfilled for long periods. The normal recruitment procedures, which are known to be dilatory, were generally responsible for such delays. The question of simplification of the procedures for recruitment of personnel needs to be looked into by the State Governments so that the vacancies are filled up with the minimum time-lag.

3.12 On the pattern of the first seven States, in the remaining States also, coordination committees are functioning, both at the State and district levels, to secure coordination in the working of the different departments and agencies concerned with agricultural production. These committees consist of the representatives of the Departments of Agriculture, Cooperation, Irrigation, Revenue, Community Development and Panchayati Raj, etc. They also include representatives of the Reserve Bank of India and cooperative institutions like the Apex and Central Banks and marketing societies. These committees meet periodically to review the progress and problems of the programme and provide overall direction and guidance in its implementation. In view of the need to keep the problems of cooperative credit, supplies and marketing under constant review and suggest effective measures for their solution, in most of the districts the coordination committees have set up sub-committees consisting of the Project Officer, the Managing Director of the Central Cooperative Bank, the Assistant/Deputy Registrar of Cooperative Societies and one or two representatives of the Reserve Bank of India.

3.13 In some of the States the coordination committees have been functioning quite effectively. They meet frequently, once a month or quarter, and discuss the various aspects of the programme and the major problems holding up the progress. Their deliberations have been helpful in dealing with the problems speedily as they crop up. In some of the States, however, the coordination committees, particularly at the State level, have been rather slack and meet after long intervals.

3.14 Certain powers, administrative and financial, have been delegated to the Collector and the Project Officer of each IADP district to ensure speedy action. These powers are reviewed periodically to locate the deficiencies and delegate additional powers, wherever necessary, to meet the growing needs of the programme.

3.15 The Central Conference of Key Personnel concerned with the IADP, held in October, 1964 made a critical review of the adequacy or otherwise of these powers and came to the conclusion that these were inadequate in many ways. The working of the seed farms, information units, implements workshops and soil testing laboratories in these districts was greatly handicapped for want of adequate powers with the concerned

officers to purchase equipment, materials, etc. which are locally available. The conference recommended that the existing powers should be reviewed and adequate power delegated to the seed-farm manager and other concerned district officers to facilitate effective functioning of these institutions. It was also felt that the financial powers to be delegated to the Project Officer of each district should be such that once the budget provision was approved for a particular year, further references to the State headquarters for financial and administrative approval for individual items within the limits of the budget should not be necessary. Such an arrangement would be conducive to advance planning and make more rational and effective utilization of the available resources.

*Operational Research Studies:*

3.16 In the operation of the Intensive Agricultural District Programme, problems of administrative, technical and other nature were encountered which needed solutions so as to overcome difficulties or bottlenecks holding up the progress. The Expert Committee on Assessment and Evaluation, therefore, desired that special studies on such problems should be carried out to help in the improvement of administration and execution of the programme in the different districts from time to time. The study of such problems would naturally have to be of a short-term nature extending over 2 to 3 months so that their results could be available quickly to the administrators. Some of the problems could be common to all the package districts while some might be special to one or a few of these districts only. The problems might also change in their magnitude and importance from year to year and would, therefore, have to be thought out every year in consultation with the district administrators. Such studies would have to be of an operational nature, aiming at the solution of the problems as quickly as possible. It was, therefore, suggested by the Expert Committee that an Operational Study Unit be established in each of the first seven package districts as a part of assessment and evaluation and that this unit should function in close collaboration with the Assessment and Evaluation Agency, on the one hand, and the Extension Agency on the other. For undertaking operational studies, special staff consisting of one Research Officer and 2-3 Investigators were sanctioned for each package district. To begin with, such a scheme was sanctioned during 1961-62 for Ludhiana district followed by sanctions for 3 more districts, namely, Raipur, West Godavari and Thanjavur during 1962-63. During 1963-64 sanctions for such a scheme were issued for the remaining 3 districts of Aligarh, Shahabad and Pali. Whereas Ludhiana district has already carried out 13 such studies, the other districts have completed 2-6 studies only on different problems. The sampling designs, questionnaires, interview schedules, etc. framed for such studies are submitted by each of these districts in advance to the Sub-committee on Operational and

Analytical Studies of the Expert Committee for scrutiny and comments, if any, and after their approval the field work is commenced by the district staff. The findings of the research studies already completed have been adopted by the administrators of the programme for improving field work.

*Training :*

3.17 In a programme of the nature of the IADP there is a continuing need to train the technical staff as well as non-officials in the objectives, technical content, methods and procedures to be followed. This need is recognized and training programmes are organized each year at various levels such as Centre, District and Block as an integral part of the programme activity. In the initial stages, training was imparted mainly in the concept, methodology and operating procedures. As the programme advanced, increasing attention was paid to the specific on-the-job training of field personnel especially the VLWs, Agricultural Extension Officers, cooperative staff; etc. Emphasis was also laid on the training of non-officials connected with cooperatives, progressive farmers, village leaders, etc. in order to elicit their active cooperation and participation. A programme of training of selected progressive farmers was initiated in the IADP districts from the 1964-65 kharif season. The object of this programme was to train a limited number of willing farmers in the specific jobs which they had to perform at a particular time on their fields to step up production. The trainees and their fields would be utilized as radiating points for the benefit of other farmers. Each course trained about 15 farmers for a period of one to three days, depending upon the specific job in which the training is to be imparted. Such a training was expected to improve considerably the traditional skill of the farmers in performing the various agricultural operations.

3.18 The following training programmes were organized during 1963-64 and 1964-65.

(a) *Central level :*

(i) A Central Conference of Key Personnel engaged in the implementation of the Intensive Agricultural Programmes (both IADP and the new Intensive Agricultural Areas Programme) was held in October 1964. The conference reviewed the progress made and the problems encountered and made a number of useful recommendations to overcome them.

(ii) Four regional conferences were organized in November, 1963, each covering a group of three to five IADP districts. The objectives of these conferences were to identify the operational and technical problems faced in the implementation of the programme, indicate the action to be taken at appropriate levels to tackle them effectively and expeditiously and

guide and assist the district staff in developing and executing a more effective and operating programme for the year ahead. A second series of five regional conferences were also organized in November-December, 1964 for the benefit of the staff of the IADP and the IAA districts.

(iii) In order to improve the technical competence of field staff, regional training courses on "Demonstrations" involving the use of all recommended practices were organized. Four regional conferences were held so far—one each at Aligarh and Ludhiana for the wheat-growing areas and one each at Palghat and Shahabad for the paddy-growing areas. These courses were attended by the district level specialists in agronomy, soils and fertilizers, plant protection, agricultural engineering and information from the package districts. The training was largely field-oriented and emphasis was laid on the correct methods and procedures to be followed in planning and supervision of composite demonstrations. The specialists trained in these conferences, in their turn, organized district level courses for the block extension staff for planning and implementing an effective programme of field demonstrations during the 1965-66 kharif season. In all the training courses, the experts from the Centre, Ford Foundation, US-AID, etc. also participated.

(iv) With emphasis being laid on intensification of fertilizer use, a series of conferences on soil-testing of three days' duration were organized by the Centre in package districts. In these conferences, up-to-date guidelines on soils, soil-testing and fertilizer use were evolved for the use of the extension workers in the IADP districts so as to assist the farmers in increasing crop production.

(v) A training programme was organized at New Delhi in April 1964 to impart training in the handling of printing equipments imported from abroad to equip the information unit set up in each of the first seven IADP districts. The offset press operators and those responsible for the preparation of plates from the districts of West Godavari, Thanjavur, Ludhiana, Raipur and Shahabad attended the conference. This was followed by another training programme at Hyderabad in May 1964 on farm radio writing for the benefit of the information staff of all the IADP districts.

(vi) A course was organized in October, 1964 at Ludhiana for the Agricultural Engineers of the IADP districts of Ludhiana, Aligarh, Shahabad, Bhandara, Raipur and Surat to acquaint them with the working of the seed-drills developed for sowing and placement of fertilizers for wheat, gram, etc. Another course of seven weeks' duration was held at the training centre of the Tractors and Farm Equipment Ltd., Madras to train Agricultural Engineers from the IADP districts in the effective maintenance of tractors and other equipments.

(vii) The special staff (consisting of Seed Development Officers and Seed Development Inspectors) appointed in the package districts for implementing the quality seed programme is being continuously trained so that they could handle the programme for production of quality seeds effectively. The latest in the series was the one organized at Hyderabad in April/May, 1964 in which the seed development staff from the southern States participated.

(viii) In order that the modern processing plants set up in the IADP districts were run on efficient lines, an intensive training course was organized at Raipur in February 1964 for the benefit of the managers and officers incharge of technical operations in cooperative rice processing plants. The course dealt with the methods of working the improved rice-mill plants and demonstrated how best the milling out-turn and operational efficiency of the existing plants could be improved.

(ix) A two-month course was organized at the Grain Storage and Research Training Centre, Hapur (U.P.) to train the representatives of cooperative marketing societies and trade organizations in the modern scientific methods of storage and handling of foodgrains so as to minimize losses caused during storage by insects, pests ; etc.

(x) A week's orientation course was organized at New Delhi for research staff employed in the first seven districts to undertake operational studies on problems thrown up in the course of the implemcntation of the programme.

(xi) One month's training courses to orient Agricultural Extension Officers and the Farm Management Specialists in the techniques of farm planning and management are being conducted at the Agricultural University, Pantnagar (U.P.) to enable these officers to provide effective guidance and assistance to the VLWs in the preparation and implementation of farm plans. One such course conducted was for the Agricultural Extension Officers and Farm Management Specialists from the districts of Pali, Ludhiana, and Aligarh. Every year 4-5 such courses would be organised.

#### *(b) District Level :*

3.19 Training conferences were also organized in the various districts for the benefit of the district and block staff. The purpose of the courses now being organized in the districts is primarily to train the staff in specific jobs so as to enable them to identify the problems in the field and decide what is important to the cultivators, provide techniques in preparing and implementing production plans and give guidance in the use of fertilizers, high quality seeds, insecticides, crop production and water use practices and improved implements. Similar training programmes are being conducted at the block level.

## CHAPTER IV

### FARM AND VILLAGE PLANNING

4.1 Farm Planning is the core of the Intensive Agricultural District Programme. A planned utilisation of production-resources, use of scientific knowledge and improved skills form the *modus operandi* through which substantial increases in agricultural production and productivity are being aimed at. Farm Planning in order to be realistic should take into account the realities of the present situation facing the Indian farmer. It is not enough to help the farmer prepare a farm plan which sets forth his decisions. The plan has to be backed by an assurance to provide the needed production supplies such as improved seeds, fertilizers, improved implements and plant protection materials. Farm planning, without such an assurance, will not have much meaning. The Intensive Agricultural District Programme seeks to provide all the production supplies called for in the plan to implement the decisions.

4.2 At present farming in India is largely carried out by traditional methods. The farm planning approach is a means for helping the farmer to move step by step towards scientific farming from traditional farming. In the traditional set-up, production is mainly for home consumption. But a process of shift in the direction of production for the market, though gradual, has been in operation. This needs to be speeded up. For increasing agricultural production to desired levels there is need for more production requisites such as chemical fertilizers, improved seeds, pesticides, better management and utilization of water as well as more power and improved implements.

4.3 The process of change from traditional farming to scientific farming, from production mainly for home consumption to production mainly for sale, from extensive cultivation to intensive cropping and from low income enterprises to higher income ones, calls for a phased programme of farm planning. This process of transformation is a progressive one and must suit the ability of the farmers, their skills and aspirations. Hence, farm planning under the Intensive Agricultural District Programme has been phased into the following three stages :—

- (a) the first stage consists of implementing a simple farm plan which emphasizes the use of a "package of improved and tested agricultural practices" on key crops. For a majority of farmers, who begin to move towards scientific farming, this is the first logical step;

- (b) the second stage consists of further refining "the package of improved agricultural practices" and using them on all the crops and enterprises raised on a farm; and
- (c) the third stage sets out to develop full use of farming resources by working out the optimum combination as to enterprises, practices and methods. The implementation of this phase requires more and more research in the area of farm management. The extension workers doing farm planning work will need additional training in farm management. A greater knowledge and appreciation of farm management principles, especially those relating to costs and returns of enterprises, enterprise combination, comparative advantage and opportunity costs, in addition to responses of enterprises to different sets of practices will be required.

4.4 Over a period of three to four years, farm planning under the IADP has been found to be effective, on the whole, in getting a substantial number of cultivators to use improved practices of a simple kind such as improved seeds, fertilizers and plant protection measures. During the year 1963-64, in the first seven districts a total number of 5.63 lakh simple farm plans were prepared as against 3.83 lakhs during 1962-63, 2.06 lakhs in 1961-62 and 0.55 lakh in 1960-61. The number increased to 6.77 lakh plans in 1964-65. In the remaining districts the number of farm plans prepared was 3.13 lakhs during 1963-64 as compared to 1.36 lakhs in 1962-63. During 1964-65, these districts prepared 4.57 lakh farm plans. The progress of preparation of farm plans from year to year is indicated in Annexure II. Experience has shown that with the increasing understanding of the farm planning processes by extension workers as well as the cultivators participating in the programme, the speed and accuracy in developing farm plans and their quality have improved considerably.

4.5 In the initial stages, in a number of districts, the recommended practices were worked out for the district as a whole and no attempt was made to fit them into the requirements of the specific areas in the district on the basis of field trials; etc. However, as the programme advanced and more research data became available, efforts were made by the district authorities to introduce greater refinements in the package of practices so as to fit them into the local situations. In Ludhiana district, application of potash is now recommended in the case of irrigated late sown wheat from rabi 1964-65 on the basis of experience of certain progressive farmers and results of demonstration plots; etc. In the IADP district of West Godavari, similar changes in regard to variety, seed rate and fertilizer use have been introduced. For instance in the case of dry paddy, the seed-rate has been enhanced from 67 to 90 kg. per hectare and for irrigated

paddy, a new variety CH-45 is recommended for both kharif and rabi seasons. Based on the experience gained in the previous years, the dose of nitrogenous fertilizers has been changed from 34 kg. to 45 kg. per hectare for rabi paddy. In Raipur district also the package of practices recommended was reviewed every year and suitable changes were made on the basis of results of composite demonstrations, experience of field staff, etc. Originally sixteen different varieties of paddy had been recommended for the district but by 1963-64 these were reduced to eight and were grouped as early, medium and late varieties. The performance of these varieties was again reviewed during 1964-65 and the number was reduced further to six only. The fertilizer doses were also modified similarly on the basis of past experience. In the case of transplanted paddy, doses of  $N_3$  and  $P_2O_5$  recommended at the start of the programme were 45 kg. and 22 kg. per hectare respectively. However, these were changed to 34 kg. each per hectare in 1963-64 and to 45 kg. each per hectare by 1964-65 on the basis of the results of demonstrations; etc. The doses of fertilizers for rainfed paddy crop were also modified similarly from 22-45 kg per hectare to 11-34 kg. per hectare. Typical package of practices recommended for the wheat crop in Ludhiana and for the early second paddy crop in West Godavari district may be seen at Annexure III.

4.6 The experience to date has also shown that more attention has to be paid to the follow-up of production plans to ensure that the recommendations made in the plans are adopted by the cultivators in time and according to the prescribed schedules. In order to secure wider participation of the cultivators, it is also necessary to launch an intensive educational campaign before the start of farm planning work in selected areas. In this task, the progressive farmers and other village leaders, including office bearers of panchayats and cooperatives, have to be involved more intimately.

4.7 The IADP districts both in the first and second groups, are still in the first stage of farm planning where each cultivator is being assisted to develop a simple farm plan for major crops grown by him. The major emphasis in the first stage of farm planning is on implementation of a package of improved practices on important crops. This implies that:—

1. the farm plan (or crop plan) must emphasize the added costs and the added returns for each crop due to improved practices. The cash costs and cash income need to be stressed at this stage;
2. production requisites, such as improved seed, chemical fertilizers, and plant protection materials will be made available on the basis of the estimates worked out in the farm plan;
3. the cooperative societies are expected to provide the needed short-term production credit based on the production plan; and

4. the farm plan proforma which is developed to suit the farming needs of each geographically homogenous area emphasizes the following basic elements:—

- (a) an inventory of the resources;
- (b) the present land use and cropping system;
- (c) improved production practices to be adopted;
- (d) production supplies that have to be purchased for cash;
- (e) production credit to be tied to the additional production due to improved practices and not to tangible security;
- (f) expected net returns from all enterprises;
- (g) a repayment plan; and
- (h) a credit application which links production needs to credit requirements.

4.8 The second stage in farm planning is not wholly different from the first one in that, instead of concentrating on key crops only, all the enterprises concerning the farm and all the cropped area will be brought under the improved farm practices. Therefore, the difference between the first and the second stage is one of degree of intensification of effort rather than kind. The process of working out a more intensive process and covering more fully other phases of village development is being tried out in selected villages. This kind of farm planning is being entrusted to experienced Agricultural Extension Officers who are working out more complete farm plans with a few progressive farmers. The effort has been to learn more about what is feasible along these lines, how much additional help it gives the farmer and what is involved on extension side in putting this phase of farm planning into operation.

4.9 Another effort being tried in selected villages puts emphasis on village-wide planning and development as well as full participation in farm planning and full use of the package of practices by every farmer. The villages in which this is being tried have been identified as IADP Stage II villages.

4.10 This experimental programme has several objectives in mind for the villages involved. First is to strengthen village leadership and through this leadership, together with extension assistance, to develop a broader plan for improvement. One effort in this direction is to have an improved farm plan for every farm in the village using the full package of improved practices on all major crops. A second is a plan to improve village institutions including the service cooperative and to organize youth clubs and women's work. Third is to plan for improvement in the use of village-owned resources to increase production. The following statement indicates the position of Stage II village work in 1964-65.

<i>District</i>	<i>Number of Stage II Villages Initiated</i>
Thanjavur	16
Raipur	15
West Godavari	6

The working out of this programme has usually required the stationing of a Village Level Worker, full time, in the village in its initial stages. More-than-average attention to the village has been required by the Block Development Officer and Agricultural Extension Officer assigned to the area with special assistance on particular problems by the District Staff.

4.11 The Stage II village programme has yielded exceptional results in a number of cases. In Polamuru village in West Godavari district, 200 hectares out of 650 hectares devoted to rabi paddy was chosen for intensive development. A Village Production Committee of 18 members was elected by the 148 farmers who had land in the 200 hectare block. Six officials also were co-opted by the Committee including the local Agricultural Extension Officer, Cooperative Extension Officer and Village Level Worker with the Block Development Officer as Committee Secretary. Eighteen farmers had 4 hectares of land or more, 14 between 2 and 4 hectares and 116 had less than 0.2 hectare. A programme of intensive production of rabi paddy was initiated in 1964 using advanced practices. Four special composite demonstration plots and two manurial observation plots were laid out in the 200 hectare area. All 148 farmers participated fully. Special arrangements for financing and for technical guidance were necessary. The programme was highly successful.

4.12 In Raipur district in 1964-65, Paoni village made remarkable progress. To qualify as a Stage II village, village leadership first organized and carried out a road building project as the village did not then have a dependable access road. All farmers in the village participated in the programme on the 405 hectares of paddy land. Due to full participation, consumption of ammonium sulphate increased to 66.7 tonnes from 12.4 tonnes the previous year and super phosphate increased to 57.9 tonnes from 6.1 tonnes. As a consequence, paddy yield per hectare on 154 farms increased from 1510 kg. per hectare to 2410 kg., an increase of 60 per cent. Part of the increase resulted from improvement in the village irrigation tank which was initiated by village leadership and carried out by the villagers through their own efforts.

4.13 No experiment with Stage III has yet been made. But it appears that some blocks in the more progressive districts like Ludhiana are now ripe for Stage III farm planning and it would be desirable to introduce Stage III experiments in a few blocks. Stage III work would, however, require a substantial modification in the staffing pattern with fewer VLWs and a large number of specialists with greater mobility for the latter.

## CHAPTER V

### **IMPROVED AGRICULTURAL PRACTICES AND OTHER SUPPORTING MEASURES**

5.1 The IADP provides funds for certified seed production and quality control programme in each district. The specific objectives of the programme are to supplement and strengthen the existing seed production and distribution programme in each district with actions that improve the quality and assure adequate amounts of seed of superior crop varieties needed by the cultivators. The goal is to establish a seed industry that meets the requirements of producing, processing, storing, treating, packing and distributing high quality (certified) seed to registered seed growers for further multiplication and distribution to cultivators. The seed of varieties recommended under IADP would have to pass through the above stages before it is used by the cultivators. Such seed is supplied through the cooperative societies and would alone be called quality seed and not the one obtained by the cultivators through some other sources. Quality seed supplied to cultivators could be used for a period of three years without much deterioration in quality and would be replaced with new seed thereafter.

5.2 With a view to strengthening the seed programme in the IADP districts to enable it to make the necessary impact on stepping up production, specific minimum programmes for production and distribution of quality seeds have been drawn up and are being implemented in these areas. This involves selection of a few superior varieties of major crops, production of breeder, foundation and certified seeds under proper supervision with certain minimum specifications and distribution of certified seeds through cooperatives and panchayats. A good number of cultivators obtain their supply of improved seed from other cultivators within the village or outside but such seed may not necessarily be quality seed. The scheme provides for special staff consisting of one Seed Development Officer and 3-5 Seed Development Inspectors in each district for providing technical assistance and supervision. The staff is in position in almost all the districts and has received training at the central, regional and district levels in the various aspects of work relating to production of quality seeds. Each of the first seven districts has also been supplied with 3-4 seed processing and cleaning equipments. Arrangements are being made to import similar equipments for use in the remaining districts as well.

5.3 The distribution of improved seeds in the package districts, both in terms of quantity and area covered, has shown steady improvement

year after year. During the year 1964-65, 18,819 tonnes of improved seeds were distributed in the first seven districts as against 11,725 tonnes in 1963-64, 8,195 tonnes in 1962-63 and 7,386 tonnes in 1961-62. The increase in the coverage of area was very substantial during 1964-65 and the total area put under improved seeds distributed through the cooperatives or the Government agency was of the order of 4.37 lakh hectares as against 2.45 lakh hectares in 1963-64 and 1.26 lakh hectares in 1961-62. The second group of districts have also shown encouraging performance in this important field of activity. The total quantity of improved seeds distributed in these districts during 1964-65 amounted to 5,852 tonnes as compared to 1,664 tonnes in 1961-62. Similarly, the area covered was 2.46 lakh hectares in 1964-65 as against 0.55 lakh hectares in 1961-62, showing an increase of 347 per cent. The district-wise figures of improved seeds distributed and area covered may be seen in Annexure IV.

5.4 The figures relating to the coverage of area under improved varieties as reported above are based on the seed distributed through the cooperative or Governmental agency. The cultivators obtain their supplies of improved seed very often through their fellow cultivators or use their own stocks. The area brought under improved varieties through natural spread in this manner is not reflected in figures referred to above.

5.5 It will appear from the progress made so far that a good beginning has been made in the IADP districts in the direction of production and distribution of quality seeds under proper supervision of technically qualified staff. It will, however, take some more time before the full impact of this programme on production is felt. The level of fertilizer use has gone up considerably in these districts and the problem of evolving varieties which would respond favourably to higher doses of fertilizer without lodging is being increasingly faced. This has led to concentration of efforts in the direction of developing such varieties. In Thanjavur district of Madras a new variety known as A.D.T. 27 has been recently released for extension. It is a *Japonica-Iudica* cross which takes about 105 days to mature and gives much higher yields than the local varieties.

#### *Fertilizers and Manures :*

5.6 The use of fertilizers is one single factor capable of making substantial contribution to increases in production and is, therefore, an essential ingredient of the package of improved practices recommended for adoption by the cultivators in the IADP districts. Concerted efforts are being made under the programme to educate the cultivators in its benefits and to provide them with the necessary facilities by way of credit and adequate and timely supplies. The measures taken in this direction consist of organisation of field demonstrations on a larger scale than hitherto, mounting of an educational drive, creation of adequate

storage facilities through construction of rural godowns, building up a large number of other distribution points in the interior within easy reach of the farmers and stocking of various types of fertilizers well in advance to meet the requirement of the districts in full.

5.7 The requirements of nitrogenous fertilizers in the package districts have been met in full through additional allocations from the Centre. Well in advance of the commencement of a year, the State Governments are required to intimate their requirements of fertilizers, both for kharif and rabi seasons and special allocations are made to meet them.

5.8 The progress made so far in the direction of fertilizer-use has been encouraging and substantial improvement has taken place in these districts under the impact of the measures outlined above. The total distribution of nitrogenous fertilizers (in terms of ammonium sulphate) in the first seven districts was about 56,000 tonnes before the introduction of the IADP. There was a 58 per cent increase in the distribution level right in the first year of the programme i.e. 1961-62 and the total quantity distributed amounted to about 89,000 tonnes. The pace of improvement was much more rapid in the subsequent years and distribution rose to about 1.19 lakh tonnes in 1962-63 and to 1.96 lakh tonnes in 1964-65 in these districts. The percentage increase in distribution of nitrogenous fertilizers in the year 1964-65 as compared to the base year in the different districts ranged from 101 in Shahabad to 869 in Aligarh.

5.9 The second group of districts started with a rather low level of offtake of nitrogenous fertilizers which was only 40,900 tonnes in 1961-62 (before the introduction of the programme). The distribution of fertilizers rose to about 67,000 tonnes in 1962-63 and to 96, 500 tonnes in 1963-64. It registered a further rise during 1964-65 when it touched the level of 1.08 lakh tonnes. In the case of second group of districts the percentage increase in distribution in the year 1964-65 over the base year ranged from 67 in Alleppey to 2,035 in Cachar.

5.10 Similarly, the distribution of phosphatic fertilizers in these districts has also registered a marked improvement. In the first seven districts, the total distribution of phosphatic fertilizers (in terms of super-phosphate), which was only to the tune of about 20,000 tonnes in 1960-61 (before the introduction of the programme) rose to 43,000 tonnes in 1961-62, 61,500 tonnes in 1962-63 and 75,200 tonnes in 1963-64. There was a further increase in 1964-65 raising the total distribution to nearly 1,04,600 tonnes. In the remaining IADP districts also the achievement in this field has been equally creditable. In the course of the very first year of the programme, the use of phosphatic fertilizers increased from 21,000 tonnes in 1961-62 to 33,500 tonnes in 1962-63. This further

increased in 1963-64 to about 52,300 tonnes. The distribution of these fertilizers during 1964-65, however, showed a decline and the total quantity supplied was 46,700 tonnes only. This has been mainly due to an appreciable decline in the quantity consumed in Alleppey and Mandya districts. In terms of percentage, the increase in the distribution of phosphatic fertilizers during 1964-65 over the base year ranged from 236 in Thanjavur to 2,059 in Ludhiana in the first group and from 43 to 1,518 in the second group of districts. District-wise details of fertilizer distribution are shown in Annexures V and VI.

5.11 The performance of the individual districts in the field of promotion of fertilizer-use had not, however, been uniformly good as they were at varying levels of fertilizer offtake at the time of introduction of the IADP. While the districts like West Godavari, Thanjavur, Ludhiana, Mandya and Surat were fairly advanced, in the other districts, namely, Aligarh, Pali, Raipur, Shahabad, Palghat, Alleppey, Bhandara, Burdwan, Sambalpur and Cachar, the level of fertilizer offtake at the inception of the programme was rather low. However, the conclusion that stands out is that the impact of the promotional efforts in the sphere of fertilizer use, which is the most vital ingredient of the package of practices, is clearly noticeable in all the package districts without exception and significant progress has been achieved in this direction.

5.12 Apart from quantitative increases, there has also been improvement in the rate of application of fertilizers in many of the districts. For example, in West Godavari the rate of application of nitrogenous fertilizers to the first crop of paddy rose from 104 kg. per hectare in the first year i.e. 1961-62 to 112 kg. per hectare in the year 1963-64 which was the recommended rate of application. Similarly, in Ludhiana district the rate of application of nitrogenous fertilizers per hectare of wheat increased from 100 kg. (which was slightly less than 50 percent of the recommended rate) in 1961-62 to 136 kg. in 1963-64. In the case of phosphatic fertilizer also, the rate of application which was around 58 kg. per hectare in the first two years increased to 104 kg. per hectare in the third year which was the same as the recommended rate. On the other hand, in districts like Pali and Shahabad, while there was steady improvement in the total quantum of fertilizers consumed, the improvement in the rate of application was not so significant.

5.13 An analysis of the crop-wise pattern of fertilizer consumption in the IADP districts has shown that the bulk of the supply (nearly 90 per cent) has been used by the cultivators on food crops including vegetables, fruits and sugarcane and only about 10 per cent has been applied to non-food crops like cotton, jute, oilseeds, etc. Even among food crops, paddy has consumed the largest quantity, about 60 to 70 per cent of the

available fertilizers. This is a very healthy and promising development made possible by resort to farm plans and close supervision over their implementation.

5.14 Although the improvement in all the districts, both in terms of total consumption as well as in the rate of fertilizer application, has been substantial, considerable scope exists for further expansion of fertilizer-use in these districts. The following measures have to be taken to ensure that the level of consumption of various types of fertilizers reaches the recommended level:

- (i) intensification of the demonstration programme including recommended doses of various types of fertilizers. Emphasis will be laid on balanced fertilizer application to crops using mixture;
- (ii) distribution arrangements would have to be further streamlined. In this connection, cooperatives will have to play an increasingly greater role. The question of adequate margins to the cooperatives to handle fertilizers, supply of fertilizers by the cooperatives to the primary societies on consignment basis, opening of an adequate number of sale points and maintaining reserve stocks in order to ensure regular supply and sale promotion work by the cooperatives, would have to be gone into; and
- (iii) the persons appointed by the cooperative societies to handle fertilizers would need to be trained in the storage and use of various fertilizers. They should also be asked to undertake sales promotion work.

5.15 In addition to the use of inorganic manures, emphasis has also been laid in these districts on the development of local manorial resources such as green manuring and compost, both rural and urban. The State Governments have been urged to organise these activities on a campaign basis in these districts. In regard to green manuring, it has been suggested that the steps to be taken, should include earmarking definite areas suitable for green manuring and providing adequate and timely irrigation facilities, raising green manure seed on Government farms and planting of avenues of green manure trees on both sides of roads in all the rice-producing areas in southern and eastern India. The important steps which have been suggested to the State Governments for augmenting the supply of rural compost include planting of shelter beds of trees, perennial shrubs and use of bio-gas plants so that cattle dung is not used as fuel, encouraging of the practice of preparation and utilization of super-phosphate-reinforced rural compost and intensive training to the extension staff, farm leaders and farmers in the technique of composting. The State Governments have also been urged to pay increasing attention to the

preparation of urban compost from town waste and its utilization as this could supplement the supply of organic manures to a considerable extent. The principal bottlenecks in intensification of urban compost work and also in its extension to new centres have been: (i) inadequate arrangements for removal of urban wastes; (ii) weak financial position of smaller municipal committees, resulting in their inability to meet recurring and non-recurring expenses on composting; and (iii) lack of adequate transport arrangements for taking compost to cultivators' fields.

*Plant Protection Measures:*

5.16 The plant protection activities were intensified in all the IADP districts during 1963-64 and 1964-65. The cultivators in these districts are being educated in planning prevention of pest and disease attacks, both by cultural and chemical methods. Such measures as the use of disease-free seeds, systematic roguing to enable the selection of the best seed material, observance of cultural and agronomic practices for minimising or prevention of incidence of diseases and pests, crop rotation and cleaning and treating godowns for grain storage, are being advocated as adjuncts to timely plant protection measures. Generally the following steps are taken in this sphere :

- (i) plant protection equipment and materials have been stocked in adequate quantities in the various depots for timely use;
- (ii) efforts are being made for prophylactic treatment of seeds and crops on an area-wide basis to ward-off attacks of pests and diseases;
- (iii) efforts are being made to develop rat control, seed control and storage grain pests control on district-wide basis; and
- (iv) steps are being taken to check the spread of pests by treating the nurseries on large scale and promptly eliminating newly found pests.

5.17 A statement showing the progress of plant protection measures in the IADP districts is given at Annexure VII. In the first seven districts, a total area of about 7.14 lakh hectares was treated against pests and diseases (including rodents) in 1963-64 as against 4.63 lakh hectares in 1962-63 and 2.46 lakh hectares in 1961-62. The plant protection activities received a further fillip in 1964-65 when the area treated increased to 8.20 lakh hectares. In the remaining districts, the total area treated against pests and diseases was of the order of 2.86 lakh hectares during 1964-65 as against 1.93 lakh hectares in 1963-64 and 1.28 lakh hectares in 1962-63. Great emphasis is laid on the treatment of seed against seed-borne diseases before its distribution to the farmers as an important prophylactic measure. As a result, more and more of the stocks available in the departmental and

other godowns as well as with the cultivators have been treated in the package districts. In the year 1964-65, in order to check seed-borne diseases, as much as 15,711 tonnes of seed were treated as against 5,814 tonnes in the year 1961-62 in these fifteen districts.

5.18 As a result of considerable intensification of plant protection measures in 1964-65, the total area treated against pests and diseases in all the fifteen districts stood at 11.06 lakh hectares as against 9.06 lakh hectares during 1963-64. In addition to the large-scale prophylactic control operations against pests of paddy in Thanjavur and West Godavari districts, area-wide control measures were demonstrated against pests of paddy in Shahabad and Raipur and against gall-fly on paddy in Bhandara and Sambalpur districts.

5.19 Large-scale demonstrations were conducted for control of weeds in Pali district and an area of 2,400 hectares was treated with 2-4D. In Ludhiana, a campaign was launched for the control of storage grain pests in 20 villages in the kharif season of 1964-65. This yielded encouraging results. The work will be further intensified during 1965-66 over larger areas. In Aligarh, the rat control operations undertaken on a large scale, with the cooperation of the local population, were very successful and the second phase of the campaign was completed in February and March, 1964 when control measures were organised in 10 selected villages in different blocks. The campaign was organised jointly by the extension staff and the farmers both in the field as well as in the village houses. In all, 2,025 hectares were treated for demonstration purposes. The main objective of this campaign was to train the entire extension staff in effective methods of rat control so that they could organise similar operations on an extended scale in the entire district in the subsequent years. A sum of Rs. 1.32 lakhs was sanctioned for rat control in Aligarh district during rabi season, 1964-65. In Shahabad, a demonstration campaign was organised against paddy weevil on an area of 6,073 hectares. In Surat, all-out efforts were made to control sugarcane scale-insects in the district.

5.20 Plant protection continued to be an essential item of the package of improved practices adopted in composite demonstrations laid out on cultivators' fields. Recommended control schedules were improved upon and extended to many crops. Specific control measures, new pesticide-formulations and new equipment were popularised through result or method demonstrations. As a result of these demonstrations, carbaryl was found to be effective against cotton and mango pests in Sambalpur district. In Pali and Aligarh districts 2-4D is becoming popular. In the districts where farmers have been convinced through demonstrations of the utility of plant protection, they have taken up protection of crops, especially paddy, cotton, groundnut, tobacco, vegetables and fruits on a large scale on prophylactic basis.

5.21 The position regarding the availability of pesticides and plant protection equipment up to the end of 1963-64 to meet the requirements of plant protection in the IADP districts was quite satisfactory. However, as the area-wide control measures are becoming popular, shortage of pesticides and equipment is being increasingly felt in several districts. Efforts are in progress to ensure that the increased requirements of the IADP districts in respect of pesticides and equipment and other materials are fully met.

5.22 There has been a growing realisation in these districts of the benefits of the use of power equipment to achieve substantial coverage with plant protection measures. A limited number of power sprayers-cum-dusters (500) was imported with the foreign exchange made available by the Ford Foundation in 1963-64 and distributed to the first seven package districts. This number was, however, far short of the total requirements and arrangements are underway to supply more such equipment to these districts. The use of power equipment was largely helpful in intensifying the plant protection activity and covering much larger area during 1964-65 than it would have been otherwise possible. Arrangements are also being made to supply power sprayers-cum-dusters to the remaining districts out of the equipment imported under various credit arrangements.

5.23 At present there is a Subject-matter Specialist in plant protection provided in each IADP district to guide the project staff in organising plant protection measures. This specialist is in addition to normal plant protection staff available in most of the districts (consisting of plant protection inspector, supervisors and fieldmen). Experience has shown that one of the factors impeding the progress of plant protection work on the scale necessary in the IADP districts is the inadequacy of trained staff to carry out this specialised work. If large-scale field operations are to be carried out, it will be necessary to strengthen the plant protection staff, both at the block and district levels.

#### *Improved Agricultural Implements :*

5.24 As mentioned in the first progress report on IADP, the basic objective of the implements programme, as envisaged under the IADP, is to assist the farmer to adopt and use, as a part of the package of practices, the kind of implements or equipment and power that will enable him to increase his production and improve his economy. To this end, an implements workshop has been provided in each package district in order to give a push to the fabrication, popularisation and demonstration of improved implements. These workshops are intended to undertake testing of the existing implements with a view to evolving modifications to suit local conditions, besides developing simple devices that can be easily fabricated and serviced by local fabricators and village artisans. Besides, they will

perform such other functions as training of village artisans and farmers in the repair and use of improved implements and servicing of transport vehicles and tractors provided under the programme. Funds have been made available to appoint one Agricultural Engineer, and one Assistant Agricultural Engineer supported by other staff to run the workshop and also to provide different kinds of equipment and materials.

5.25 The progress of establishment of the workshops was somewhat slow up to the year 1962-63 in all the IADP districts due to a variety of reasons such as paucity of competent and experienced Agricultural Engineers, difficulty in acquisition of land for construction of workshop buildings, delay in procurement of equipment, etc. During 1963-64, however, steps were taken to complete the setting up of these workshops with a view to speeding up the implements programme and by now the workshops are complete and have started functioning in all the IADP districts. A brief review of the activities of the workshops and the progress made so far under the implements programme are given below:—

*1. Testing and Development:*

- (i) the two-fold activities initiated by the implements workshops in most of the districts included development of simple equipment that could be locally fabricated and giving assistance to the manufacturers and other research centres in the evaluation and field trials of the equipment to suit local conditions;
- (ii) need was felt in the package districts to develop an equipment for the side-placement of fertilizers, deeper than the seed. Concerted efforts were, therefore, made in the workshops in most of the districts to develop some such equipment. Simple devices which allow proper placement of seed and fertilizers in one operation requiring manual feeding were developed at Aligarh, Ludhiana, Raipur and Shahabad;
- (iii) automatic seed-cum-fertilizer drills were developed in collaboration with some of the manufacturers. 50 of these were supplied to the wheat-growing districts for field evaluation in farmers' holdings;
- (iv) fertilizer placement devices in wet puddle were developed for paddy areas in Thanjavur. Prototype models of bullock-drawn and tractor-mounted devices were also made for field evaluation;
- (v) other equipment on which the development work had made satisfactory progress included tractor-mounted power spraying outfit, land levelling equipment, corn and cotton planters with fertilizer-placement attachments besides simple tools and implements for seed-bed preparation and inter-cultural operations; and

(vi) the implements workshops at Aligarh, Ludhiana, Raipur, Shahabad, Thanjavur and Pali were properly equipped to undertake fabrication of newly developed equipment for use in demonstrations. In Thanjavur district, a tractor cage-wheel equipment was fabricated and supplied to some of the tractor owners. The workshops were also catering to the need for fabrication of equipments required for irrigation, plant protection and seed cleaning and also processing equipment.

## *II. Demonstration and Popularisation:*

- (i) Composite and method demonstrations on the use and care of improved implements were carried out in most of the districts. Mobile teams, equipped with necessary implements and tools, have been organised in some of the districts to demonstrate the use of improved implements and equipment on farmers' holdings. These teams help the extension staff, village artisans and farmers in the proper up-keep and repair of farm equipment;
- (ii) these field demonstrations have been able to make some impact and the demand for improved implements in most of the districts has gone up considerably. In Aligarh, improved implements worth Rs. 1.82 lakhs were supplied to the farmers in 1963-64 as against the supply of implements worth Rs. 1.50 lakhs in 1962-63 and 1961-62. In Raipur, more than 5,000 simple paddy threshers were locally fabricated and used by the farmers during the last 2 years. In Shahabad district, more than 3,000 mould-board ploughs were purchased by the farmers in 1963-64 as against the purchase of 1,659 ploughs in 1962-63, 349 in 1961-62 and 7 in 1960-61. In Ludhiana, the implements programme has made a considerable headway and almost every farmer owns an iron plough. The majority of the farmers have taken to improved implements and are purchasing them directly from the local fabricators. In Mandya and Surat districts also, the use of improved implements is becoming increasingly popular. Similarly, in the other districts like Thanjavur, Bhandara, Pali, Burdwan, Sambalpur, Alleppey and Palghat, a large number of farmers are gradually adopting better implements.

## *III. Education and Training:*

- (i) An important aspect of the implements programme under the IADP is to educate and train the farmers in the selection, use and care of improved implements through field demonstrations. One set of improved implements, hand tools and plant protection equipment has been provided to each VLW for this purpose.

Village artisans and local fabricators are being trained by the workshops to improve their skill and provide better sales and service facilities to the farmers. In Shahabad district, some of the artisans trained in the workshop have formed cooperatives to equip their village shops with better tools and equipment in order to undertake local fabrication of simple equipment and provide better service facilities. District level specialists have been imparted intensive training in the scientific techniques of laying out composite demonstrations at regional courses in which Agricultural Engineers have also participated. As a continuation of the regional training programmes, courses in demonstration-training are now being organised in all the districts in which the block staff are being trained;

- (ii) in order to ensure supply of good quality implements to the farmers, blue prints and prototype models of improved implements are supplied to the local fabricators trained at the workshop in Ludhiana and some of the other districts;
- (iii) on-the-job training programmes are also organised for the extension workers in the blocks and villages at frequent intervals; and
- (iv) a three-week intensive on-the-job training in tractor maintenance and repair was organised in Madras in the months of November-December, 1964. All Agricultural Engineers from the IADP districts participated in it.

#### *IV. Service:*

- (i) All the workshops have organised service facilities for the transport vehicles, tractors, plant protection, seed cleaning and other equipment; and
- (ii) the tractors and trailers provided in the districts are being used mainly for transportation of supplies and equipment in the blocks. These are also being used for demonstration and hiring-out to the farmers in some of the districts. In Thanjavur district, tractors with ancillary equipment are being utilised for hiring-out to the farmers. During 1963-64, 26 tractors were engaged to plough 1,415 hectares, harrow 25 hectares and puddle 4,045 hectares. Heavy crawler tractors were engaged in Raipur and Surat for soil conservation work.

#### *Soil Testing:*

5.26 During the initial stages of the programme, fertilizer recommendations made to the farmers in the package districts were mostly of a generalised nature which applied equally to all the fields of individual

cultivators. These generalised recommendations did not take into account the probable field-to-field differences in fertility levels. It is natural to expect that a specific fertilizer recommendation for a cultivator's field, based on the analysis of soil, would be more convincing to him than the generalised recommendation for the area as a whole. To this end, the farmers in the IADP districts are being provided with soil testing service by establishing nine new soil testing laboratories and strengthening the six existing laboratories. Among the first seven districts, new laboratories have been set up in West Godavari, Shahabad, Raipur and Aligarh districts while the existing laboratories have been strengthened in Thanjavur, Ludhiana and Pali districts. Among the remaining districts, new laboratories have been set up at Alleppey, Palghat, Surat, Burdwan and Cachar while the existing laboratories have been strengthened in Bhandara (at Nagpur), Mandya (at Bangalore) and Sambalpur. Each laboratory is working under the supervision of a trained and experienced Assistant Soil Chemist, assisted by graduate Research Assistants and Junior Scientific Assistants. Some of the equipment supplied to the soil testing laboratories is lying idle in some districts due to lack of spare parts and facilities for servicing and repairs of the equipment. This position will be rectified soon as spare parts are now being manufactured in the country and arrangements are being made for proper servicing and repairs of equipment.

5.27 The programme of establishment of soil testing laboratories did not make satisfactory progress during 1961-62 and in 1962-63 mainly due to procedural delays in the issue of State Governments' sanctions and in recruitment and posting of staff. Considerable delay also occurred in the procurement of equipment available in the country. However, in all the first seven districts, the laboratories were completed or nearing completion during 1964-65. The equipment imported from abroad has also been made available to the laboratories in almost all the districts.

5.28 In the remaining districts, the new laboratories proposed to be established at Surat and Palghat are almost nearing completion, while those at Cachar, Alleppey and Burdwan are still in a preliminary stage of construction. The strengthening of the existing laboratories at Nagpur, Bangalore and Sambalpur through addition of staff and equipment has been completed and these are working to full capacity.

5.29 A total number of 2.98 lakh soil samples had been collected from the package districts and sent for analysis to the laboratories upto 1964-65. Out of these, 2.02 lakh samples had been analysed and fertilizer recommendations made on the basis of the analysis of 1.83 lakh samples. It is observed that generally there is a considerable time-lag between collection of soil samples and their analysis in the laboratory, resulting in considerable delay in making fertilizer recommendations to farmers. This

is often due to the fact that the samples are collected in large numbers during a certain part of the year only, rather than spreading the work evenly over the whole year. Inadequate staff and equipment facilities are also responsible for this time-lag to some extent, but with the laboratories being properly strengthened it should be possible to speed up the analysis work. In order to enhance the utility of the soil test data, correlation studies between crop-responses and fertilizer application on the basis of soil tests have been undertaken in the package districts. A large number of three-plot demonstrations have been laid out comparing (a) farmers' traditional practices, (b) standard package of practices using generalised State recommendations and (c) package of practices using fertilizer recommendations based on soil test. It is expected that in due course it will be possible to prepare soil fertility maps for each block and ultimately for each village in the IADP districts. Such village-wise fertility maps have already been prepared in the Thanjavur district. The other package districts have also taken steps to increase the soil testing work, with a view to building up adequate data on the basis of which block-wise and village-wise fertility maps could be prepared.

#### *Water Use and Management:*

5.30 Efficient and timely use of the available water in accordance with the soil characteristics and crop requirements is an important factor which is receiving considerable attention under the IADP. A scheme for scientific water use and management has been undertaken in the IADP districts to demonstrate sound and practical methods of solving farm irrigation and drainage problems and provide on-the-ground training and experience in water management to the extension staff. This scheme envisages laying out of a few pilot demonstrations on proper farm irrigation and drainage practices in each district. It includes the appointment of a Water Use Specialist in each district with supporting staff viz., two overseers and six field-men, and procurement of some scientific instruments as well as a few small earth-moving implements for land-levelling etc. Most of the States have already sanctioned the scheme, but due to dearth of trained staff, Water Use Specialists are in position only in the districts in the States of Uttar Pradesh, Maharashtra, Punjab, West Bengal, Rajasthan and Madras. The other State Governments have also taken steps to fill up the post of the Water Use Specialist and it is expected that the incumbents will be in position soon. Some of the earth-moving implements are not available locally and steps have been taken by the Government of India to import them for making available to the package districts.

5.31 The districts of Aligarh and West Godavari have laid out demonstrations in water use and management. In the other districts, preliminary surveys are underway and an action programme is

being drawn up. However, considerable efforts are necessary to intensify this aspect of the programme through such measures as construction of irrigation channels and its improvement, land-levelling, proper bunding and provision of drainage facilities on an area-wide basis, training of staff in proper use of water and its management, establishing demonstrations on water requirements of crops, frequency of irrigation and farm drainage, etc.



## CHAPTER VI

### AGRICULTURAL CREDIT, MARKETING AND STORAGE

#### *Credit:*

6.1 One of the basic requirements of the Package Programme is the provision of adequate and timely production-based and production-oriented credit to the farmers. In the selected districts, the institutional set-up of cooperatives is being utilised to finance the farmer-members so that proper distribution, utilisation and recovery of loans could be ensured. The cooperative societies in these areas render service to member-cultivators by advancing mainly short-term credit in addition to substantial medium-term credit as required in the crop production plans. To enable the Central Cooperative Banks working in the IADP districts to meet fully the credit demands of the farmers, the Reserve Bank of India supplements their resources considerably. The position of credit limits sanctioned by the Reserve Bank of India and the Apex Banks and the drawals against them may be seen in Annexure VIII. The State Governments have taken the following measures for ensuring an adequate flow of credit through the cooperatives and its proper use:—

- (i) the cooperative institutions at various levels are being strengthened by (a) formation of societies in villages, wherever there are none, (b) revitalising the defunct societies, (c) launching a drive for increasing the membership of existing societies, and (d) attracting deposits;
- (ii) disbursement of loans, both in cash and kind, as reflected in the farm plans and in instalments according to the agricultural operations involved;
- (iii) removal of restrictive features such as low surety limits, low levels of individual maximum borrowing power, insistence on mortgage of land as security for loan etc.
- (iv) relating disbursement and recoveries of amounts to the cropping season;
- (v) strengthening the cooperative marketing structure in order to link credit with marketing;
- (vi) simplifying and streamlining the procedures followed by the cooperatives in sanctioning and disbursement of loans;
- (vii) strengthening the supervisory arrangements in order to ensure that the credit is used for the purpose for which it is given; and

(viii) training of the members and office-bearers of cooperative societies with a view to orienting them towards the programme.

6.2 As a result of the efforts made since the inception of the programme, considerable progress has been achieved in the strengthening of the cooperative institutions at various levels and to some extent in the liberalisation of lending policies in the directions required. There have also been substantial increases in the volume of loans advanced by these institutions. The statement at Annexure IX shows the district-wise progress. The total membership of the primary societies in all the IADP districts taken together increased from 17.49 lakhs at the end of the year 1962-63 to 18.74 lakhs in 1963-64 and to 19.81 lakhs in 1964-65. A substantial proportion of the population has been brought within the fold of the cooperatives in the districts of Ludhiana (96%), Thanjavur (85%), Aligarh (62%), West Godavari (60%) Mandya (76%), and Sambalpur (59%). In the remaining districts, the population-coverage ranged between 32 and 54 per cent. In terms of villages, the cooperatives had attained by the end of 1962-63, complete coverage in the districts of Ludhiana, Aligarh, Thanjavur, Raipur, Alleppey, Palghat, Bhandara and Sambalpur. In Surat, the coverage increased from 94 percent in 1962-63 to 100 percent in 1964-65. There was a fairly satisfactory improvement in this direction in the other districts also where at the end of 1964-65 the coverage of villages by cooperatives ranged between 94 and 98 percent.

6.3 There was also an improvement in the financial strength of the primary societies in these districts during the period under review. The share capital of the societies increased from Rs. 5.54 crores in 1962-63 to Rs. 6.71 crores in 1964-65. Similarly, the working capital increased from Rs. 30.76 crores to Rs. 33.60 crores. The deposits with these societies were of the order of Rs. 4.34 crores at the end of the year 1964-65 as compared to Rs. 3.65 crores at the end of the previous year. The volume of loans, mainly short-term, advanced by the societies for agricultural purposes, rose from Rs. 18.71 crores in 1962-63 to Rs. 19.33 crores in 1963-64 and to Rs. 20.14 crores in 1964-65. Though there was general progress in the levels of operation, significant headway has yet to be made in the direction of evolving and implementing a programme for the emergence of viable units at the primary level.

6.4 It may be mentioned that a number of States have come forward to extend *taccavi* loans to the cultivators in addition to cooperative credit. These loans are advanced mostly for the purchase of fertilizers and other production requisites. This has been resorted to especially in areas where the cooperatives are weak. Fertilizers have also been supplied on *taccavi* in certain districts e.g. Ludhiana where cooperative structure is fairly strong and is in a position to render this service.

6.5 Along with the increase in the volume of loaning, the overdues have tended to be high in many of the districts like Thanjavur, West Godavari, Raipur, Aligarh, Pali, Alleppey, Bhandara, Sambalpur, Cachar and Mandya. In some cases as in Pali, the high overdues were due mainly to the inability of the farmers to repay their loans on account of wide-spread crop failures during successive crop seasons. The high percentage of overdues to demand is also partly attributable to the introduction of measures intended to make the credit production-based and production-oriented under the IADP to which the cooperative institutions as well as the farmers are taking time to get used to. Equally important reason for the increase of overdues is the element of compulsion in some areas for the preparation of farm production plans as a condition precedent to permitting any credit and on the lifting of the kind portion before allowing any part of the loan in cash.

6.6 Experience has shown that some of the practices like observance of seasonality in drawals and repayments of loans, provision of credit more in kind than in cash and liberalising some of the standards relating to loan operations, can, in their very nature, be built up only gradually and that a greater involvement of the credit agency in the working of the programme is essential for ensuring that adequate support to it is forthcoming on the side of credit. However, as the programme has advanced, appreciable improvement has been in evidence in the adoption of these practices by the cooperative institutions in the package districts. In almost all the districts, the kind-component of the loan has been on the increase and disbursement and recoveries of loans on the basis of the cropping seasons has been resorted to in a progressively increasing measure.

6.7 With the rapid increase in the coverage of the programme and consequent growing volume of farm planning work in the districts, it was decided during 1964-65 to discontinue the insistence on completion of farm production plans as a basis for sanctioning of loans by the cooperative credit societies.

#### *Marketing :*

6.8 Since the very inception of the Package Programme, emphasis has been laid on increasing cooperative marketing of agricultural produce in the selected districts. The State Governments have been implementing a phased programme for the purpose. The progress achieved in the districts has, however, been uneven. The statement at Annexure X indicates the growth of the marketing societies and their activities since the inception of the IADP. It will be observed that the total value of the agricultural produce handled by the cooperatives in these districts increased from Rs. 3.2 crores before the introduction of the IADP to Rs. 8.19 crores in 1963-64 and further to Rs. 13.58 crores in 1964-65 showing an increase of nearly

323 per cent in the size of the operations of the cooperative marketing societies in these districts over the period of implementation of the programme. During the same period, the increase in the quantum of agricultural produce handled by cooperative marketing societies in the entire country was to the extent of 30 per cent only. The districts which have recorded significant improvements in this sphere are Ludhiana, Thanjavur, Raipur, Mandya, Surat and Palghat. The increases reported by the districts of West Godavari, Shahabad, Cachar and Burdwan are rather insignificant.

6.9 The membership of the marketing societies increased from 1.37 lakhs at the inception of the programme to 1.79 lakhs during 1964-65. During the same period, the share capital of these societies increased from Rs. 0.85 crore to Rs. 1.61 crores. At the end of the year 1963-64, 100 per cent of the markets in these districts, except in the districts of Ludhiana, Alleppey, Burdwan and Surat, were covered by cooperative marketing societies.

6.10 Although there has been substantial expansion, as mentioned above, in the operations of the marketing societies, the improvement in the linking of credit with marketing, an aspect on which considerable emphasis has been laid under the programme, has not been correspondingly good during the same period. At the inception of the programme, 20 societies were recovering the loans advanced by them from the sale proceeds, the amount recovered being Rs. 35.53 lakhs. Upto the end of 1964-65 the number of such societies increased to 70, the total amount of loans recovered being Rs. 47.18 lakhs. There is, therefore, need to intensify the efforts in this direction so that more and more loans advanced by the credit societies could be recovered by the marketing societies through the sale of produce raised by the farmer-members.

#### *Storage:*

6.11 The construction of storage godowns registered further progress during the period under review. The pace of progress could be accelerated to some extent on account of the special allocations of G.C. sheets arranged by the Centre for use in the IADP districts in the construction of godowns. Through these allocations it was possible to meet the requirements of the districts in full. The district-wise progress of godown construction may be seen in the Annexure XI. According to the programme drawn up at the beginning of the IADP, 4416 rural godowns were to be constructed to saturate the districts with storage facilities. Of these, 1928 godowns had been constructed upto the end of June, 1965 and 742 were under construction. Much of the back-log was in the remaining eight districts where the programme was introduced at a later stage. The construction programme needs to be intensified in all the IADP districts so that the back-log could be cleared as early as possible.

6.12 With the launching of the new Intensive Agricultural Areas Programme in a large number of districts in the country, the task of providing adequate storage facilities to the cultivators has assumed large proportions. A very high priority has, therefore, been accorded to construction of godowns at various levels both in the IADP and IAA districts. The scheme has been included under the Special Development Programmes for Agriculture (Crash Programme) and is being treated as "Centrally Sponsored" for which additional funds are to be made available during 1964-65 and 1965-66, over and above the State Plan ceilings. The State Governments have been asked to take advantage of this special concession and draw up a suitable programme of building up a wide net-work of godowns in the intensive agricultural districts during the remaining two years of the Third Plan period (1964-65 and 1965-66). During 1964-65, a total amount of Rs. 2.07 crores was sanctioned to the Government of Andhra Pradesh, Bihar, Madhya Pradesh, Mysore, Punjab, Rajasthan, Maharashtra and Orissa for construction of 161 rail-head/mandi level godowns and 1260 rural godowns. In the implementation of the programme, the State Governments have been advised to map out the areas which are inadequately served at present by godown facilities so that such areas could be attended to first in the construction of godowns.



## CHAPTER VII

### **AGRICULTURAL INFORMATION AND EXTENSION EDUCATION**

7.1 The agricultural information and extension education activities being undertaken in the IADP districts can be broadly categorised into :—

- (i) Dissemination of information through the use of various media of information and publicity; and
- (ii) Field demonstrations.

7.2 Agricultural information and extension education activities being undertaken in the IADP districts aim at dissemination of useful information through the use of various media of information and publicity. To this end, a nucleus information unit has been set up in each district. The information units have three principal functions. The first is to produce the information materials needed to inform and educate the cultivators and to make sure that this material is distributed to reach all of them. Secondly, it assists the Subject-matter Specialists in preparing specialized material, visual aids, etc., which they use in the training of cultivators. Thirdly, the information units carry on training for the village level workers, teaching them how to make and use simple visual aids in order to be more effective in their work with cultivators. To be able to discharge these functions effectively, each unit has been provided with staff headed by a District Agricultural Information Officer and the necessary equipment.

7.3 The information units, taken as a whole, are now producing a steady flow of locally useful information materials for the cultivators. These materials include most of the standard media used in communication, such as simple leaflets, comprehensive statements covering the details of the programme, posters on improved practices, exhibits, photographs, cinema slides, charts and other visual aids. There has been a steady increase in the use of the press and the radio through which it is possible to reach large numbers of cultivators quickly and frequently.

7.4 The Centre and the States have strengthened this local activity through providing standard literature such as leaflets or posters which the district units can adopt for their local use and by supplying certain publications, exhibits, motion pictures, etc., which can be most effectively produced at the State or Central level.

7.5 The information units in the districts have taken time to be established with the result that during the initial period, the extension education activities could not be undertaken in these districts on the scale

desired. However, in most of the districts the units have, by now, been established, staffed and equipped and the information work is getting into full swing to support the programme. In the first seven districts, some of the information equipment, which was not locally available, was imported with the foreign exchange made available by the Ford Foundation and supplied to the information units. In the case of the second group of districts, arrangements are under-way to import the necessary equipment.

7.6 Emphasis has also been laid on the maximum use of such media as 'teaching charts' and 'hoardings' for wide dissemination of information about the package of practices for major crops. The district information units are engaged in producing teaching charts which contain all information about the improved cultivation of particular crops and thus provide an inexpensive and effective teaching media to the extension workers. Some of the package districts have made arrangements to display hoardings at strategic places depicting the package of practices for different crops in local languages. This has gone a long way in creating an awareness about the improved methods of agriculture among the farmers. The use of these two media mentioned above, needs, however, to be further intensified.

#### *Field Demonstrations :*

7.7 In the package districts, the extension education activities are primarily centred around field demonstrations, mainly of a composite type, which constitute the most effective tool for motivating the cultivators to adopt improved production practices. A large number of such demonstrations were laid out on cultivators' fields in all the districts during 1963-64 and 1964-65. The relevant information is shown, district-wise, in Annexure XII.

7.8 The results of these demonstrations have been encouraging and appreciable increases in yields have been recorded on the demonstration plots as compared to the 'controls'. Annexure XIII gives the district-wise and cropwise average yields obtained on demonstration and control plots during 1963-64 and 1964-65 and the extent of increases in yields as compared to the controls. Some of the significant increases in respect of the principal crops of paddy, wheat, jowar and bajra for 1963-64 are shown below :

Crop	District	Average yield in demonstration plots (Q/H)	Average yield in control plots (Q/H)	Percentage increase in yield in demonstration plots over controls
Paddy	Shahabad	28.50	17.04	67
	Raipur	32.78	20.06	63
	Thanjavur ( <i>Kuruvai</i> )	31.79	25.39	25
	West Godavari ( <i>Rabi</i> )	37.77	32.80	15
	Palghat ( <i>Virippu</i> )	32.06	22.53	42
	Alleppey ( <i>Punja</i> )	37.30	26.75	39
	Sambalpur	29.84	20.92	43
	Bhandara	46.16	27.84	66
	Cachar	33.56	22.98	46
Wheat	Mandya	46.73	37.89	23
	Aligarh	21.74	12.77	70
	Ludhiana	28.90	20.48	41
Maize	Pali	16.35	10.23	60
	Aligarh	17.56	9.88	78
Bajra	Ludhiana	39.13	23.84	64
	Aligarh	12.82	7.16	79
Jowar	Pali	7.02	2.25	212
	Bhandara ( <i>Rabi</i> )	6.22	2.69	131
		6.82	3.66	86

Q/H : Quintals per hectare

7.9 The performance of demonstrations laid out during 1964-65 was equally good. The average yields for selected crops on the demonstration and control plots and the percentage increase over control are shown below for some of the IADP districts:

Crop	District	Average yield in demonstration plots (Q/H)	Average yield in control plots (Q/H)	Percentage increase in yield in demonstration plots over controls.
Paddy	1. Shahabad	32.09	20.18	59
	2. Thanjavur ( <i>Kuruwai</i> )	33.47	26.75	25
	3. Raipur	27.49	20.25	36
	4. Alleppey ( <i>Punja</i> )	36.28	26.40	37
	5. Palghat ( <i>Viruppu</i> )	36.06	25.70	40
	6. Burdwan ( <i>Aman</i> )	33.30	27.91	19
	7. Cachar ( <i>Sali</i> )	41.92	28.50	47
Wheat	1. Shahabad	16.28	7.24	123
	2. Bhandara	8.79	5.24	68
	3. Surat	13.83	10.37	34
Maize	1. Aligarh	17.61	9.76	80
	2. Ludhiana ( <i>Hybrid</i> )	34.75	19.22	81
Bajra	1. Aligarh	12.62	7.83	61
Jowar	1. Bhandara	8.65	4.82	79
	2. Surat ( <i>Irrigated</i> )	11.73	7.85	49

Q/H: Quintals per hectare

7.10 Information relating to the cost of cultivation for both demonstration and control plots has been collected for all the IADP districts. The data for kharif 1963-64 indicate that average cost of cultivation per hectare for paddy crop on control plots ranged from Rs. 201 in Shahabad to Rs. 540 in Alleppey and that on demonstration plots ranged from Rs. 300 in Raipur to Rs. 672 in Alleppey. The ratio of additional rupees invested to additional income on demonstration plots for paddy ranged from 1.8 in Bhandara to 3.75 in Burdwan district. Thus, for every extra rupee invested on paddy, the farmer could expect to earn anything between Rs.

1.80 and Rs. 3.75. In the case of wheat crop, the average cost of cultivation per hectare on control plots ranged from Rs. 142 (in Bhandara) to Rs. 395 (in Ludhiana) and that on demonstration plots from Rs. 229 (in Bhandara) to Rs. 522 (in Ludhiana district). The ratio of additional expenditure to additional return ranged from 1.2 to 3.3 in different districts. In the case of crops like maize, cotton and sugarcane, it was seen that such additional income per extra rupee invested was Rs. 3.6, Rs. 3.8 and Rs. 4.7 respectively. Only in exceptional cases the ratio fell below Rs. 1.5. These results amply established the superiority of the package of practices recommended for different crops.

7.11 Operational studies on composite demonstrations have been conducted in the IADP districts of Ludhiana and West Godavari. A survey of crop demonstration (wheat) was also conducted in Aligarh district by the Agro-Economic Research Centre, Delhi. These studies have indicated the need for exercising great care in the selection of demonstration plots.

7.12 Since the composite demonstrations on cultivator's fields involving the use of "package of improved practices" are being used to convince the cultivators about the technical feasibility and economic soundness of the recommended practices, the studies indicated the need for assisting the cultivators to maintain a record of the inputs and the expenditure made thereon as also of the resultant harvest and income. The studies conducted in the above districts have shown that higher average yields have been attained on demonstration plots as compared to control plots. In Ludhiana, as compared to the control plots the average yield in demonstration plots during 1963-64 was 41 per cent higher in case of wheat, 49 per cent higher in case of paddy and 42 per cent higher in case of groundnut. In West Godavari, during kharif 1963-64, the yield of paddy in demonstration plot was 18 per cent higher than that in control plot. In Aligarh, the average yield in demonstration plots as compared to control plots during 1963-64 was 70 per cent higher in case of wheat, 78 per cent in case of maize, 79 per cent in case of bajra, 65 per cent in case of sugarcane and 73 per cent in case of cotton. While most of the demonstrations were adjudged as quite successful, these studies indicated that lack of knowledge of the demonstrations and of the package of practices on the part of cultivators constituted the main reasons accounting for partial or non-adoption of the package of practices. These studies have further indicated that quite a few demonstration plots are not laid out near the road-side where they could be seen by a large number of cultivators. Adequate publicity by setting up boards in local languages, giving the practices adopted in such plots, also leaves much to be desired. Before the laying of demonstrations, it is imperative that the cultivators are thoroughly educated through the various information media and in group meetings regarding the package of practices. The results of demonstration plots need also to be explained at the harvest time.

and in group meetings. The importance of arranging systematic visits of groups of farmers to the demonstration plots has been emphasised by these studies.

7.13 The study of demonstrations in Aligarh indicated that about 70 per cent of the cultivators were not aware of the type and quantity of fertiliser used on the demonstration plots. Fertiliser recommendations were not adjusted according to soil-test results for demonstration plots. The follow-up of the demonstrations at all levels left much to be desired and a close supervision of each process in the laying out of demonstration is considered important for the success of the demonstration.

7.14 Although the results so far achieved on demonstration plots have been quite encouraging, the standard of these demonstrations has not been uniformly high in all the districts. The deficiencies generally noticed are of the following nature:

- (a) lack of proper supervision and follow-up;
- (b) lack of adequate field training to the extension staff in conducting demonstrations;
- (c) inadequate cooperation from the farmer because of lack of full awareness on their part, of their role in the planning and implementation of demonstration programme; and
- (d) encumbering the VLW with too many demonstrations which he cannot effectively plan and supervise.

7.15 Efforts have been directed in the package districts to rectify these deficiencies by giving intensive training to the Subject-matter Specialists in the scientific techniques of demonstrations and their proper supervision and follow-up. Organisation of demonstration-training by the district staff for the orientation of the block level extension staff is now a regular feature. It is also ensured that the VLWs are made responsible only for a limited number of demonstrations—say four to five—in a crop-season which they can effectively plan and supervise.

7.16 In addition to the composite demonstrations involving package of practices, the districts have also initiated efforts in the direction of establishing 'whole-farm' demonstrations and also area-wide demonstrations. The area-wide demonstrations include adoption of plant protection measures to control pests and diseases, including rodents, in a selected group of villages or a block; development of correct water use and drainage system for the command area of a tube-well or a distributary and soil conservation measures for a given catchment area.

## CHAPTER VIII

### PROGRESS OF EXPENDITURE

8.1 In the first seven districts, the Intensive Agricultural District Programme is being implemented partly with financial assistance from the Ford Foundation. This financial assistance is available for only 100 blocks out of a total of 141 blocks in these districts. For the remaining 41 blocks as well as the second eight districts no assistance from any outside agency is available. In pursuance of the decision to treat all the districts alike in regard to Government help, in these 41 blocks as well as in the second eight districts, the Government of India, in addition to meeting their share of expenditure, have assumed responsibility for all the expenditure on different items of the programme which is being met from the Ford Foundation grant in the first seven districts. This has meant that the financial commitment of the State Governments in the remaining eight districts also is restricted to the limit accepted in respect of the first seven districts. The pattern of sharing the cost on different items of the programme between the Government of India and the State Governments for 41 blocks of the first seven districts and for the second eight districts is as follows :—

Items	Percentage share of the Govt. of India	Percentage share of the State Govts.
1. Additional Staff	75	25
2. Additional Staff for Survey and Assessment work	100	—
3. Transport	100	—
4. Training	100	—
5. Implements Workshop	100	—
6. Quality Seed Programme	100	—
7. Soil Testing Laboratory	100	—
8. Scientific Demonstrations	100	—
9. Information Support Programme	100	—
10. Water Use and Management Scheme	100	—
11. Storage Godowns	To be financed under the normal Plan Scheme of the State Departments of Cooperation.	

8.2 The above pattern of financial assistance applies to non-loan expenditure only. The IADP also envisages provision of funds in the form of short and medium-term credit to enable the cultivators to purchase various production requisites and also to meet such requirements as purchase of bullocks, construction and repair of minor irrigation works, purchase of implements and equipments, land development measures etc. The short-term loans are being provided mainly by the cooperatives with the assistance of the Reserve Bank of India. It is being supplemented by Government *taccavi* in areas where the cooperatives are weak and not able to provide production finance to the required extent. With regard to medium-term credit, the requirements of the districts are met partly by the Government and partly by the cooperative institutions.

8.3 In the first seven districts, the total non-loan expenditure incurred during the Third Plan period is estimated at approximately Rs. 8 crores. The corresponding figure of expenditure is about Rs. 5.90 crores in respect of the remaining eight IADP districts.

8.4 Necessary financial provision was made, both in the Central and State Third Five Year Plans, for implementation of the Intensive Agricultural District Programme. The outlay provided by each State in their Third Plan is indicated in Annexure XIV. The Annexure also shows the actual expenditure incurred during the first four years (1961-65) of the Third Plan as well as the anticipated level of expenditure during the last year, 1965-66. It will be observed that in most of the IADP districts, the level of expenditure during 1961-62 and 1962-63 was relatively low, due primarily to the initial delays in completing the various preparatory measures such as appointment of additional staff, appointment of special staff for bench-mark and assessment surveys, delays in the establishment of the implements workshop, soil-testing laboratory, and information unit and implementation of the quality-seed programme, etc. The subsequent years, however, witnessed considerable stepping up of the tempo of expenditure in all the districts as a result of the accelerated pace of work. No expenditure was incurred during 1961-62 in Cachar (Assam), Bhandara (Maharashtra) and Burdwan (West Bengal) as the programme was taken up in these districts only in 1962-63.

8.5 The IADP is being administered and executed by the State Governments as a centrally aided scheme. There are, however, certain items of the scheme on which the Government of India are incurring direct expenditure. These relate to :—

- (i) provision of nucleus staff at the Centre to handle the work connected with the programme and to coordinate and provide overall direction and guidance to the project staff in the districts;

- (ii) organization of Central training courses for the benefit of key personnel connected with the programme in the districts;
- (iii) procurement and supply of equipment including transport vehicles; and
- (iv) provision of staff and equipment at the Centre to handle the work connected with the bench-mark surveys and assessment of progress of the programme from year to year.

8.6 For the above items, a financial provision of Rs. 75 lakhs was made in the central plan of the Ministry of Food & Agriculture for the Third Plan period. Against this provision, it is expected that the total expenditure by the close of the Third Plan period will be of the order of Rs. 51.81 lakhs.

8.7 It may be pointed out that the financial allocations made directly under the IADP are intended to provide for certain basic facilities such as additional staff, implements workshop, soil testing laboratory, information unit, staff for bench-mark and assessment surveys, demonstrations, training and other purposes. In other words, these are only 'nucleus' funds earmarked for items which are considered essential aids to the achievement of rapid and significant increases in production aimed at under the programme. Such nucleus funds can be utilized to the maximum advantage for agricultural production in these districts if they are supported by adequate financial allocations for undertaking programmes of minor irrigation, soil conservation, production and distribution of improved seeds, supply of fertilizers, plant protection etc. These constitute important ingredients of the package of improved agricultural practices to be adopted by the cultivators for stepping up their farm output. The State Governments have generally given preference to the IADP districts in the allocation of funds for intensification of minor irrigation, land development and such other programmes which help to develop the production potentialities of these areas.

## CHAPTER IX

### ASSESSMENT AND EVALUATION

9.1 Assessment and evaluation, considered to be an essential feature for the programme, was taken up in the original as well as new districts. As has been explained in the first report, under this programme of assessment and evaluation two types of investigations are being carried out; one is a series of bench-mark and assessment surveys conducted yearly in each IADP district based on random sampling method and the other consists of special studies on operational and analytical problems arising in the course of implementation of the programme.

#### *Bench-mark and Assessment Surveys*

9.2 The object of these surveys is to assess the changes being brought about by the package programme in the agronomic practices followed by the cultivators, the agronomic conditions prevailing around them and the yield of major crops in these districts.

9.3 For the former objective, an agronomic and agro-economic survey is conducted every year in each district, covering both the cropping seasons, based on a suitably chosen random sample of cultivators. The details of the types of agronomic and agro-economic data collected under this have been given in the earlier report. This includes the cropping pattern, and manurial and other cultivation practices followed by the cultivators, besides the credit, marketing and storage facilities availed of by them. In addition to this, during the year 1963-64, information regarding capital formation was also collected. In the year 1964-65, a schedule was introduced to study cultivators' reasons for not adopting the improved practices.

9.4 For estimates of yield rates, although crop-cutting experiments are being conducted in various States as a regular feature, the number of such experiments conducted on a crop in a district is not adequate to measure with sufficient precision the yearly changes in the yield rates at the district level. Hence these experiments are being augmented substantially by the IADP series of crop-cutting experiments. The results from the two series are integrated to obtain the estimates of yield with higher precision.

#### *Control Areas*

9.5 Since the object of the bench-mark and assessment surveys is to study the changes brought about due to the package programme, it

was felt desirable to view them against the background of the changes taking place due to normal extension activities in comparable regions outside the package districts. For this purpose, a few suitable blocks are chosen outside each of the IADP districts and surveys similar to those organised in the package areas are conducted in these blocks also. These blocks are technically termed as "control" area. Data collected from control area also provide a basis for studying the trend in yield in the IADP area after removing the effects of the season.

9.6 As has been explained in the earlier report, the control area for each district consists of 3 to 6 blocks chosen from the neighbouring districts in such a way that they are as similar as possible to the programme district agro-climatically and in their level of past agricultural development.

9.7 The names of the control blocks selected for the fifteen districts covered under the IADP are given below. The year in which the benchmark and assessment surveys were started in each district is given within brackets.

IADP District & State	District in which control blocks are located	Name of control blocks
1	2	3
(1) Thanjavur, Madras (1961-62)	South Arcot Tiruchirapalli	Orathur, Bhuvanagiri, Portonovo. Tirumanur, Manikandam
(2) West Godavari, Andhra Pradesh (1961-62)	East Godavari	Rajanagaram, Samalkot, Tallerevu, Kothapeta, Nagram
(3) Shahabad, Bihar (1961-62)	Patna Gaya	Paliganj, Naubatpur Arwal, Daudnagar
(4) Raipur, Madhya Pradesh (1961-62)	Bilaspur Bastar Raigarh	Masturi, Janjgir, Pamgarh Charma, Kanker Sarangarh
(5) Aligarh, Uttar Pradesh (1961-62)	Bulandshahr Mathura Etah	Danpur, Pahasu, Jewar Naujheel, Kursanda, Sadabad, Kasganj

District & State	District in which control blocks are located	Name of control blocks
		1
(6) Ludhiana, Punjab (1961-62)	Ferozepur Sangrur Ambala	Moga Ahmedgarh Chamkaur Sahib
(7) Pali, Rajasthan (1961-62)	Jodhpur Sirohi Jalore	Bilara, Luni Pindwara Jalore
(8) Alleppey, Kerala (1962-63)	Quilon Kottayam	Chavara, Anchalamood Pallom, Madapally
(9) Palghat, Kerala (1962-63)	Kozikhode Trichur	Tanur, Wandur Wadakkanchery, Ollukkara
(10) Mandya, Mysore (1962-63)	Mysore	Chamarajanagar, T. Narasipur, K.R. Nagar
(11) Surat, Gujarat (1962-63)	Broach	Ankleshwar, Hansot, Jhagadia, Valia, Chaswad
(12) Sambalpur, Orissa (1962-63)	Bolangir Kalahandi Sundargarh	Binka, Bolangir, Titliagarh Junagarh Sundargarh
(13) Burdwan West Bengal (1963-64)	Bankura Hooghly Birbhum Nadia	Indus Pandua Bolpur Santipur
(14) Bhandara, Maharashtra (1962-63)	Nagpur Chanda	Ramtek, Kuhi Brahmapuri, Nagbhir, Chimur
(15) Cachar, Assam (1963-64)*		

\* On account of the peculiar location of the district no suitable control area could be chosen for the district.

9.8 Lately it is observed that many of the blocks included in the control areas for IADP districts are being brought under the Intensive Agricultural Areas Programme (IAAP) and it is feared that this may vitiate the purpose for which the control areas were meant. However, since replacing these blocks by others would mean discontinuity in the data and thereby it might not serve the purpose of year to year comparisons, it was decided to keep them as they are for the time being. Since the IAAP, which is a less intensive programme than the IADP, may take some time to start showing visible impact, at least in the initial years, the data from control areas may serve the purpose for which they were originally meant.

#### *Sampling Plan*

9.9 As has been explained in the previous report, the sampling plan for the agronomic and agro-economic enquiry is that of stratified multi-stage sampling with zones of 1 to 4 blocks constituting the strata, and a village and a holding as the first and second stage units respectively. The sample consists of 800—1000 operational holdings randomly selected from the IADP district and the control area. The same set of holdings are canvassed during both kharif and rabi seasons. About 25 per cent of the sampled holdings are canvassed year after year while the rest are selected for the enquiry afresh every year. The data are collected by frequent interviews with the cultivators supplemented by physical verification wherever considered necessary.

9.10 For the crop-cutting surveys, a block or a VLW circle is treated as a stratum, a village as a first stage unit, a field as second stage unit and a plot within a field as ultimate unit of sampling. For each of the important crops, about 300 plots in the IADP district and about 50 to 75 plots in its control area are randomly selected. Yield data from these plots are obtained by actual harvest and weighment. Besides, information on the various agronomic practices followed in these fields is also collected.

9.11 The crops covered by crop-cutting programme under the benchmark and assessment surveys in the various IADP districts and their control areas are indicated in the table below:—

District and State	Crops covered
1	2
1. Thanjavur, Madras	paddy ( <i>kuruvai</i> ), paddy ( <i>samba</i> ) and paddy ( <i>thaladi</i> )
2. West Godavari, Andhra Pradesh	paddy (first crop) and paddy (second crop)
3. Shahabad, Bihar	paddy, wheat and gram
4. Raipur, Madhya Pradesh	paddy
5. Aligarh, Uttar Pradesh	bajra, maize, wheat, barley, gram and pea
6. Ludhiana, Punjab	maize, wheat, gram, cotton and groundnut
7. Pali, Rajasthan	bajra, maize, jowar, wheat and barley
8. Alleppey, Kerala	paddy (first crop) paddy (second crop), paddy (third crop) and coconut
9. Palghat, Kerala	paddy (first crop) and paddy (second crop)
10. Mandya, Mysore	paddy, ragi and sugarcane
11. Surat, Gujarat	paddy, jowar and cotton
12. Sambalpur, Orissa	paddy (autumn) and paddy (winter)
13. Burdwan, West Bengal	paddy (winter)
14. Bhandara, Maharashtra	paddy, wheat and rabi jowar
15. Cachar, Assam	paddy (autumn), paddy (winter) and sugarcane.

#### *Organisation and Field work*

9.12 The overall guidance of the bench-mark and assessment surveys is entrusted with the Institute of Agricultural Research Statistics (ICAR) New Delhi, which is responsible for preparing the sampling design for the survey, coordinating the work in different districts, arranging for

the analysis of data collected and for preparation of reports. In each State, the field staff are under the technical control of the Director of Statistics or Joint Director (Statistics) / Deputy Director (Statistics)/ Statistician in the Department of Agriculture. A Statistical Officer is specially appointed for the work in each district and he is assisted by a field inspector, a statistical assistant, a supervisor, two computors and a team of 9 to 14 field investigators. Each field investigator is required to canvass the schedules of agronomic and agro-economic enquiry in about 100 to 130 holdings and supervise the crop cuttings conducted in his jurisdiction. The primary agency for conducting the crop cuttings is the VLW. On an average, a VLW is required to conduct about 4 crop cuttings in each crop season.

9.13 An important feature of the bench-mark and assessment surveys is the stress that is laid on the accuracy of field work by intensive training and adequate supervision by the staff at the district and State headquarters and the officers from the IARS. The first report of this Committee has considered this aspect at length.

#### *Scrutiny and Tabulation of Data*

9.14 Various schedules containing the data collected under the agronomic and agro-economic enquiry and crop cutting surveys are scrutinised and coded at the district level by the Statistical Officer and his headquarter staff before being sent to the Institute of Agricultural Research Statistics where the data are analysed. Subsequent to the installation of the Electronic computer at the Institute it has been possible to reduce the time-lag between the receipt of schedules from the districts and preparation of final tables. The results of the agronomic and agro-economic enquiry for the years 1961-62, 1962-63 and 1963-64 in all the 7 districts originally covered under the programme have been tabulated. For the remaining districts where the survey was started in 1962-63, the analysis of data for that year has been completed. Tabulation of the data of the agronomic and agro-economic enquiries in 1963-64 and 1964-65 for the new districts and for the year 1964-65 in the old districts are in progress. Data of the crop-cutting experiments have been analysed for all districts upto the year 1964-65. This report covers the results of crop-cutting experiments upto the year 1964-65 in all districts and the results of the agronomic and agro-economic enquiry upto the year 1963-64 for the original 7 districts and the same for the year 1962-63 for remaining districts. These results are discussed in Part II of the report.

#### *Operational and Analytical Studies*

9.15 As a part of assessment and evaluation of the IADP, special studies of short-term nature were conducted on the problems thrown up

in the course of the implementation of the programme. These studies were intended to help in the improvement of the execution of the programme by keeping the authorities regularly apprised of the problems in order to enable them to take timely remedial steps.

*Operational Studies :*

9.16 One set of the studies related to the problems and bottlenecks faced from time to time by the implementing agencies in their area of operation. These studies had been of short duration extending over a period of 2 to 3 months. The aim of such studies was to help the district and central authorities in operating this programme more efficiently; hence these were referred as "operational studies". The Operational Research Units which had undertaken these studies have been sanctioned for all the seven districts of the first set. As many as 23 studies have been completed in the districts of Ludhiana, Raipur, West Godavari and Aligarh. The results of some of the more important studies are summarised below:—

9.17 *Farm Planning:* A study of farm plans was conducted in Ludhiana, Raipur and West Godavari districts. The study in Ludhiana revealed that about 90 per cent of the cultivators received some loan, but that was only 40 per cent of the required amount according to the farm plans. Need for meeting medium-term loans through cooperatives was also emphasised. The report also indicated the need for providing more effective follow-up guidance to help implementation of the farm plans. Similar study in Raipur disclosed a large gap between the plans prepared and those actually financed mainly due to non-payment of outstanding loans. It also indicated occurrence of delay (about 3 months) in processing and scrutiny of applications. The results in West Godavari also revealed inordinate delay in sanctioning of loans.

9.18 *Crop Demonstration:* With regard to the economics of the recommended practices these studies have shown that for every rupee expended on the recommended practices, there was a return of Rs. 2.0 to 3.6 in Ludhiana, of Rs. 2.4 in West Godavari and Rs. 3.3 to Rs. 5.6 in Aligarh. In Ludhiana nearly 50 per cent of the demonstrations were quite successful and the remaining ones either average or poor. These studies indicated that non-adherence to the package of practices by the cultivators has been the main reason for the failure of the demonstrations. Lack of proper publicity and proper guidance to the cultivators were also the other findings of the studies.

9.19 *Storage Godowns:* Studies conducted on storage godowns in Ludhiana, Raipur and West Godavari have revealed the need for opening

more sub-depots in certain areas of Ludhiana and more godowns in the upland region of West Godavari. In Raipur, nearly 80 per cent of the depots have been situated at long distances (11 to 30 miles) from the main supply centres. These studies have also brought out the need for improving storage accommodation and certain other facilities.

*Role of Cooperatives:*

9.20 Studies conducted in Raipur and West Godavari have indicated delay in the supply of credit, need for supply of other inputs along with the fertilizers, repayment in instalments and change in the seasonal pattern of credit. Need for bringing landless tenants into the cooperative fold has also been emphasized. The study in West Godavari also reveals the reasons for cultivators not joining the cooperatives, which include, among others, readily available loans from money-lenders, non-availability of loans from cooperatives to landless tenants and lack of awareness on the part of cultivators.

9.21 Other studies cover miscellaneous items like the functioning of VLWs and block level staff, utilization of loans for minor irrigation, cultivators' attitude towards adoption of improved practices etc.

*Analytical studies :*

9.22 The analytical studies covering more fundamental aspects of the programme are required to be studied over slightly longer period extending from 6 months to even one year. It was felt more appropriate that such studies might be conducted by an independent agency or institute with research experience such as Agro-Economic Research Centres or Agricultural Colleges. Such studies have been conducted by the Agro-Economic Research Centres of Delhi, Gwalior, Madras, Anand, Jorhat and Santiniketan. The results of some of the important studies, which have been completed, are summarised below:

9.23 *Cooperative Credit:* The study conducted in Thanjavur revealed that there was marked growth of the financial structure and the operation of the societies. But the scheme of credit supply still suffered from some weaknesses e.g. inadequate financing even for productive purposes, untimely supply of credit and non-availability of credit for family expenditure. The study emphasised the need for linking credit with marketing.

9.24 *Demonstrations:* Effectiveness of the crop demonstration was studied in Aligarh district. Economic assessment of the demonstration justified that the treated crops were more profitable. The study revealed that the cultivators needed to be further convinced about the practical

benefits of package of inputs and to be assured of the regular supply of requisite supplies.

**9.25 Adoption of Improved Practices:** The study in Cachar revealed that the awareness of the cultivators about the IADP and their response to it were quite encouraging. The progressive cultivators had become 'fertilizer-minded' and had been convinced about the utility of other improved practices. The study in Pali indicated that the cultivators demonstrated considerable awareness about the improved practices, but the adoption had been on a limited scale. Small and medium farmers preferred traditional methods to the improved ones. The need for linking credit with marketing was also emphasised. The cooperatives had been found weak in both the districts.

**9.26 Evaluation of the Working of IADP Districts:** Evaluation of IADP was done in Shahabad and Sambalpur districts. The yield per acre had increased in both the districts as a result of application of increased inputs in Shahabad and diversified cropping pattern and transplantation in Sambalpur area. Fertilizers were being used by the cultivators in both the districts. The studies in both the areas emphasised the need for dissemination of information and knowledge of better farming on a more scientific basis and in a more convincing manner.

#### *Utilization of Operational and Analytical Studies in the Programme Planning :*

**9.27** The results obtained through both the types of studies have been examined from time to time by a Sub-Committee on Operational and Analytical Studies appointed by the Expert Committee. The findings of these studies were also taken into account by the Fifth Central Conference of Key Personnel when they discussed the problems and the bottlenecks retarding the progress of IAD Programme. Some of the main recommendations adopted by the above Conference on the basis of the findings of these studies are given below:—

(i) *Supplies:* In view of the shortage of fertilizers, the Conference suggested the development of local manurial resources. It was also felt that special fertilizer allocations should be made in time and the timely supplies at the destination should be assured according to schedule. On the question of supplying agricultural implements and other requisites, it was pointed out that there was an immediate need to organise a cooperative shop by the marketing society at the district headquarters. The Conference recommended that the cooperatives should be entrusted with the distribution of improved seeds, wherever they were ready to take up this work.

(ii) *Credit:* It was suggested that legislation enabling compulsory recordings of all tenants and recognising the existing practice as obtained

in the States, might enable the cooperatives to provide adequate credit to such tenants.

(iii) The Conference recognised the need for appropriate classification of the agricultural needs into short, medium and long term purposes. The eligibility for medium-term loans should be determined on the basis of the probable cost involved and the repaying capacity of the farmer.

(iv) *Marketing*: The Conference noted that there was no perceptible improvement in cooperative marketing and the situation would still worsen in view of the monopoly procurement of foodgrains.

(v) *Godowns*: In view of the severe cut in the State Annual Plan provision for 1966-67, the Conference recommended that the provision for construction of godowns should be considered and adequate provision made through the National Cooperative Development Corporation in order to continue this useful scheme, if necessary, even outside the State Plan ceilings approved for 1966-67.

#### *Expert Committee*

9.28 For reviewing the progress of work under the bench mark and assessment surveys and the operational and analytical studies and for examining the results obtained through these enquiries, the Government of India have constituted an Expert Committee consisting of representatives of the Planning Commission, the Ministry of Food and Agriculture, the Programme Evaluation Organisation, the Reserve Bank of India, the State Governments and the Ford Foundation. For detailed consideration of the programme of work and draft reports, the Expert Committee has constituted two sub-committees, one for survey and assessment and the other for operational and analytical studies carried out under the programme.

9.29 On a recommendation of the Expert Committee, the State Governments were requested in April, 1962, to set up a sub-committee in each of the programme districts to ensure coordination between the different agencies concerned with the assessment and evaluation of the programme. The sub-committee, besides considering matters pertaining to survey, assessment and research studies would be responsible for recommending the order of priorities in which the various problems thrown up in the course of the working of the programme may be taken up for study. Such sub-committees have been already set up in all districts except Shahabad and West Godavari.



सत्यमेव जयते

## **ANNEXURES**

**I to XIV**



सत्यमेव जयते

## ANNEXURE

*Intensive Agricultural District*

Sl. No.	Name of district	Total No. of blocks in the distt.	No. of blocks covered					Total No. of villages in the distt.
			1960-61	1961-62	1962-63	1963-64	1964-65	
1	2	3	4	5	6	7	8	9
<b>A. First group of districts:</b>								
1.	Thanjavur	36	23	26	26	28	36	2657
2.	West Godavari	25	20	20	22	25	25+	911
3.	Shahabad	20	6	20	20	20	20	3081
4.	Raipur	23	—	16	16	18	23	3855
5.	Aligarh	17	—	14	17	17	17	1746
6.	Ludhiana	10*	—	9	9	9	10*	1004
7.	Pali	10	—	7	10	10	10	866
	<b>Sub Total</b>	<b>141</b>	<b>49</b>	<b>112</b>	<b>120</b>	<b>127</b>	<b>141</b>	<b>14120</b>
<b>B. Second group of districts:</b>								
8.	Alleppey	17	—	—	10	15	15	99
9.	Palghat	16	—	—	5	7	15	303
10.	Mandya	10½	—	—	9½	10½	10½	1329
11.	Surat	34@	—	—	29½	29½	34@	2198
12.	Sambalpur	29	—	—	15	15	23	3426
13.	Burdwan	33	—	—	10	24	24	2855
14.	Bhandara	13	—	—	—	13	13	1478
15.	Cachar	15	—	—	—	4	8	2019
16.	Six selected blocks in J & K	6	—	—	—	—	—	—
	<b>Sub Total</b>	<b>173½</b>	<b>—</b>	<b>—</b>	<b>78½</b>	<b>117½</b>	<b>142½</b>	<b>13707</b>
	<b>Grand Total</b>	<b>314½</b>	<b>49</b>	<b>112</b>	<b>198½</b>	<b>244½</b>	<b>283½</b>	<b>27827</b>

\* One more block has been added to Ludhiana district during 1964-65.

† The district has been re-delimited into 16 blocks in 1964-65.

@ The number of blocks has increased from 29½ to 34 because of the opening of new Tribal blocks during 1964-65.

I

*Programme—Coverage*

(Area in lakh hectares)

1960-61	No. of villages covered					Total gross cropped area in the distt.	Gross cropped area covered							
	1961-62	1962-63	1963-64	1964-65	10		11	12	13	14	15	16	17	18
317	464	570	957	1557	7.27	1.39	1.75	2.80	4.46					
170	326	675	892	894	4.84	1.49	2.59	4.05	4.05					
174	1276	2235	2664	2686	6.84	0.10	0.74	1.37	1.79					
—	446	1090	2147	3855	11.87	1.03	2.10	1.87	2.79					
—	296	605	1746	1746	5.34	0.08	0.44	0.86	1.67					
—	202	922	922	1004	3.75	1.42	2.20	1.96	1.98					
—	274	446	680	684	5.18	0.19	0.41	0.83	1.21					
661	3224	6543	10008	12426	45.09	5.70	10.23	13.74	17.95					
—	—	30	49	70	2.21	—	0.48	0.85	1.30					
—	—	82	134	298	3.15	—	0.31	1.08	1.81					
—	—	320	638	1329	2.62	—	0.36	0.78	0.92					
—	—	2198	2198	2198	7.72	—	1.50	1.77	2.29					
—	—	759	862	1802	7.22	—	0.24	0.51	0.52					
—	—	158	1552	1613	5.21	—	0.006	0.37	0.86					
—	—	—	1241	1474	5.17	—	—	0.17	0.44					
—	—	—	160	819	2.41	—	—	—	0.007	0.24				
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	3547	6834	9603	35.71	—	2.896	5.537	8.38					
661	3224	10090	16842	22029	80.80	5.70	13.126	19.277	26.33					

## ANNEXURE II

*Intensive Agricultural District Programme—Farm Production Plans Prepared*

S. No.	District	Number of farm families in the district	No. of Farm Production Plans prepared				
			1960-61	1961-62	1962-63	1963-64	1964-65
1	2	3	4	5	6	7	8
1. Thanjavur		301000	36683	53401	68689	105437	156556
2. West Godavari		200000	16571	75262	125982	116948	119376
3. Shahabad		165000	2033	20621	59555	78719	93735
4. Raipur		264000	—	20000	39745	99340	108145
5. Aligarh		150000	—	9271	22648	96258	106000
6. Ludhiana		54000	—	19926	47788	39908	46521
7. Pali		98000	—	7100	18921	26115	46691
Sub Total		1232000	55287	205581	383328	562725	677024
8. Alleppey		164000	—	—	8000	45912	73000
9. Palghat		82000	—	—	7382	23848	57002
10. Mandy		139000	—	—	24945	63204	67045
11. Surat		241000	—	—	70770	87429	95439
12. Sambalpur		321000	—	—	23062	29280	46054
13. Burdwan		348000	—	—	1500	45843	78552
14. Bhandara		265000	—	—	—	17000	25742
15. Cachar		145000	—	—	—	400	14070
Sub Total		1705000	—	—	135659	312916	456904
Grand Total		2937000	55287	205581	518987	875641	1133928

## ANNEXURE III

*A. Package of Practices for Wheat—Ludhiana*

No. \_\_\_\_\_ Block \_\_\_\_\_

Name of cultivator \_\_\_\_\_ Dated \_\_\_\_\_ 196

Village \_\_\_\_\_ Address \_\_\_\_\_

Acres owned \_\_\_\_\_ Acres rented out \_\_\_\_\_ Acres rented in \_\_\_\_\_

Acres cultivated \_\_\_\_\_ Acres irrigated \_\_\_\_\_ Source of irrigation \_\_\_\_\_

New case or old case \_\_\_\_\_

Recommended Packages of Practices for Wheat Crop  
for Medium Fertility Type Soils—1 Acre

Practices and expected costs and returns	Irrigated timely sown	Irrigated late sown	Unirrigated
	1	2	3
Seed variety	C 273	C 286 or C 273	C 273
Seed rate	37 kg Rs. 20.00	37 kg Rs. 20.00	37 kg Rs. 20.00
Seed treatment	Solar heat and agrosan treatments Rs. 0.50	Rs. 0.50	Rs. 0.50
Sowing time	Oct. 15-Nov. 15	After Nov. 15	Oct. 15-Nov. 15
Sowing	1½"—2" deep in lines, 7"—9" apart		
Interculture	Keep the crop free from weeds Rs. 8.00	Rs. 8.00	Rs. 8.00

1	2	3	4
<b>Manures and Fertilizers :</b>			
Farm Yard Manure	—	—	—
Calcium Ammonium Nitrate	100 kg (2 bags) Rs. 31.00	100 kg (2 bags) Rs. 31.00	50 kg (1 bag) Rs. 15.50
Superphosphate	50 kg (½ bag) Rs. 10.50	50 kg (½ bag) Rs. 10.50	50 kg (½ bag) Rs. 10.50
Muriate of Potash	20 kg (1/5 bag) Rs. 9.00	20 kg (1/5 bag) Rs. 9.00	—
Irrigation (No.)	4—6	4—6	—
Grain Yield (Quintals)	11—13	7—9	5—7
Bhusa or Fodder (Quintals)	19	13	9
Grain Value (Rs.)	451—533	287—369	205—287
Bhusa Value (Rs.)	114.00	78.00	54.00
Total Value (Rs.)	565—647	365—447	259—341
Package cost (Rs.)	79	79	55 (Approx.)
Cash value over package cost (Rs.)	486—568	286—368	204—286
<b>Prices used (Rupees per quintal) :</b>			
	Wheat	—	41.00
	Wheat Bhusa	—	6.00

## (ANNEXURE—III—CONTD.)

*B. Package of Practices for Paddy—West Godavari*

Second Crop :

Season : Kharif

Area for which the practices are recommended—Areas served by wells and tanks

<i>Item of improvement</i>	<i>Improved practice recommended</i>
1. Suitable variety or varieties recommended:	M.T.U. 10; S.L.O. 13; M.T.U. 3; B.A.M. 3; G.E.B. 24; (M.T.U. 8 for Chintalapudi area.)
2. Seed treatment:	"Agrosan GN" 1 oz. for 30 lbs. of seed.
3. Seeding rate:	25 to 30 lbs. per acre to be sown in 5 cents nursery.
4. Season of sowing nursery:	2nd week of May to 1st week of July.
5. Precautions to be taken in the nursery:	
(a) Plant Protection:	Endrin spraying (1 oz. in 4 gallons)
(b) Fertilization:	30 cart-loads of Farm-yard manure per acre as basal dressing; 1 lb. of Ammonium sulphate per cent as top dressing.
(c) Cultural operations:	Weeding by manual labour.
6. Period of transplanting:	3rd week of June to August.
7. Spacing and method of planting:	8"×4" in fertile soils and 6"×3" in light soils where line planting is done. 6"×4" in normal planting.
8. Fertilization of the main field:	
(a) kinds of organic manures:	Farm-yard Manure or Compost or Green manure.
(i) Dose:	8 to 10 cart-loads per acre, 4000 lbs. green material per acre.
(ii) Time of application:	Before puddling.

(b) Inorganic fertilizers:	N	P	K
(i) Dose :	30	30	—
(ii) Time of application :	10 N as basal dressing, 15 N after one month of planting, 5 N at the time of primordial stage (chirupotta stage)		
9. Interculture:	Intercultivate twice with small country plough or Push-hoe (20 and 35 days after planting)		
10. Irrigation :			
(a) No. of irrigations :	15 to 20		
(b) Interval for each irrigation :	Once in a week taking into consider- ation the rainfall received till the grain hardening stage.		
11. Drainage:	No problem		
12. Plant Protection:	Prophylactic	Curative	
(a) Type or types of insecticides	Endrin	B.H.C. 10% Endrin, Zinc Phosphide	
(b) Quantity or dose :	1 pint for two sprayings	20 lb. B.H.C. per acre 10 oz. of Endrin per acre 1 oz. of Zinc Phosphide for 5 acres	
(c) Time of application :	One month after planting and another at primordial stage (Chiru- potta stage)	Whenever needed	
(d) Rat control measures :	—	Poison baiting with Zinc Phosphide.	
13. Cost of package (additional cost involved)	Rs. 45.50 per acre		
14. Additional yield expected :	8 maunds		

- |   |                     |
|---|---------------------|
| 15. Expected price per unit of commodity. | Rs. 12.50 per maund |
| 16. Additional income :                   | Rs. 100.00          |
| 17. Remarks: additional net income.       | Rs. 54.50           |

#### Foot-note

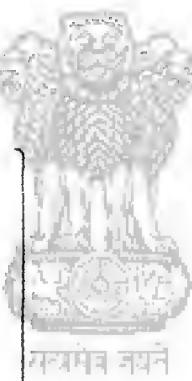
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Sufficient data is not available to recommend the application of potash to paddy. This aspect may be taken up after the results are obtained from the trials conducted during 1962 kharif season.

In Polavaram Block M.T.U. 10 occupies larger areas (above 40%) than the other varieties. In Gopalapuram M.T.U. 10 is grown to a large extent, next to S.L.O. 13.

*Dose of nitrogen recommended:*

<i>Name of the Block</i>	<i>Dose of 'N' per acre</i>
1. Kovvur	}
2. Nidadavole	}
3. Gopalapuram	}
4. Polavaram	}
5. Koyyalagudem	}
6. Buttaigudem	}
7. Chintalapudi	}
8. Kamavarapukota	}
9. Pedapadu	}
10. Denduluru	}
11. Bhimadole	}
12. Tadepalligudem	}
13. Pentapadu	}
	30 pounds nitrogen in the form of inorganic fertilizers in three split doses.



## ANNEXURE IV

*Intensive Agricultural District Programme—Improved seeds distributed & area covered*

Sl. No.	District	Seed distributed (Tonnes)					Area covered by improved seeds (Hectares)						
		1961-62	1962-63	1963-64	1964-65	1961-62	1962-63	1963-64	1964-65	1961-62	1962-63	1963-64	1964-65
1	2	3	4	5	6	7	8	9	10				
<b>A. First Group of Districts:</b>													
1.	Thanjavur	1,271	1,797	4,628	8,100	23,000	33,000	84,000	148,000				
2.	West Godavari	976	1,215	1,440	1,471	28,874	35,939	39,920	46,481				
3.	Shahabad	651	1,502	3,276	3,883	12,238	32,119	79,938	179,116				
4.	Raipur	1,679	1,628	845	1,476	11,688	16,599	13,418	15,307				
5.	Aligarh	481	469	136	222	16,359	3,910	2,693	2,909				
6.	Ludhiana	628	551	742	1,459	16,289	13,900	17,780	20,046				
7.	Pali	1,700	1,033	658	2,208	17,510	16,206	7,500	25,000				
	Sub-Total	7,386	8,195	11,725	18,819	125,958	151,673	245,249	437,359				

B. Second Group of Districts :

8. Alleppey	96	154	625	398	1,300	1,400	1,806	5,354
9. Palghat	216	417	432	518	4,391	8,456	8,747	9,440
10. Mandyā	55	120	135	183	1,123	6,070	6,600	7,712
11. Surat	941	1,364	1,090	1,784	45,936	80,088	52,738	60,000
12. Sambalpur	275	229	1,085	935	—	58,442	66,525	84,000
13. Burdwan	—	310	1,111	1,478	—	—	302	36,951
14. Bhandara	81	107	166	286	2,385	4,010	17,324	10,879
15. Cachar	—	—	142	270	—	—	—	11,950
Sub-Total	1,664	2,701	4,786	5,852	55,135	158,768	202,641	245,503
Grand Total	9,050	10,896	16,511	24,671	181,093	310,441	447,890	682,862

## ANNEXURE V

*Intensive Agricultural District Programme—Distribution of Nitrogenous Fertilizers  
(in terms of Ammonium Sulphate)*

(in Tonnes)

S. No.	District	Quantities distributed in the districts				
		1960-61	1961-62	1962-63	1963-64	1964-65
1	2	3	4	5	6	7
<i>A. First group of districts</i>						
1.	Thanjavur	17460	20940	26326	29020	41899
2.	West Godavari	18631	34463	49000	41199	64802
3.	Shahabad	8160	11173	15685	10881	16420
4.	Raipur	5424	8172	7376	9827	13936
5.	Aligarh	1056	1588	4476	7967	15392
6.	Ludhiana	5232	11382	14629	16572	40413
7.	Pali	234	1150	1400	1012	3101
Sub-Total :		56197	88868	118892	116478	195963
<i>B. Second group of districts</i>						
8.	Alleppey	—	4767	6448	7005	7970
9.	Palghat	—	2285	6480	8294	11043
10.	Mandyā	—	15280	27115	41939	38138
11.	Surat	—	10032	13452	16093	24116
12.	Sambalpur	—	816	1731	2783	4619
13.	Burdwan	—	7720	10020	17280	18360
14.	Bhandara	—	—	1847	2983	3122
15.	Cachar	—	—	37	128	790
Sub-Total :		—	40900	67130	96505	108158
Grand Total :		56197	129768	186022	212983	304121

## ANNEXURE VI

*Intensive Agricultural District Programme—Distribution of Phosphatic Fertilizers  
(in terms of Superphosphate)*

(in Tonnes)

S. No.	District	Quantities distributed in the districts				
		1960-61	1961-62	1962-63	1963-64	1964-65
1	2	3	4	5	6	7
<i>A. First group of districts</i>						
1.	Thanjavur	13574	17687	28422	34748	45562
2.	West Godavari	4642	16466	20671	19055	32084
3.	Shahabad	917	3555	5187	6010	6472
4.	Raipur	479	2148	3773	8249	8294
5.	Aligarh	218	343	605	1198	3077
6.	Ludhiana	367	2001	2437	5617	7922
7.	Pali	64	637	449	275	1165
Sub-Total:		20261	42837	61544	75152	104576
<i>B. Second group of districts</i>						
8.	Alleppey	—	6881	8039	9492	7040
9.	Palghat	—	1471	2424	3226	3898
10.	Mandya	—	6813	10900	21865	12317
11.	Surat	—	2934	3062	4180	6113
12.	Sambalpur	—	502	1760	2935	3752
13.	Burdwan	—	2130	6660	8550	10900
14.	Bhandara	—	117	592	1963	1840
15.	Cachar	—	—	33	115	823
Sub-Total:		—	20848	33470	52326	46683
Grand Total:		20261	63685	95014	127478	151259

*Intensive Agricultural District Programme—Progress of plant protection work*

ANNEXURE VII

Sl. No.	District	Area treated against pests & diseases including rodents (Hectares)						Seed treated (Tonnes)				Pesticides formulations used (Tonnes)			
		1961-62	1962-63	1963-64	1964-65	1961-62	1962-63	1963-64	1964-65	1961-62	1962-63	1963-64	1964-65		
1	2	3	4	5	6	7	8	9	10	11	12	13	14		
1.	Thanjavur	35200	63900	282500	353000	503	584	1962	4741	534.00	936.00	1146.00	2675.00		
2.	West Godavari	43926	95260	190000	214000	1868	2359	2708	2275	162.50	215.00	421.00	356.00		
3.	Shahabad	14954	12934	24370	45816	2560	3507	3109	854	114.92	209.00	88.46	166.00		
4.	Rajpur	3237	18414	40469	24686	74	100	163	224	104.90	208.00	342.00	212.00		
5.	Aligarh	2400	3622	3582	14140	120	181	190	707	21.00	87.00*	59.00	121.00		
6.	Ludhiana	125758	203228	152773	153375	383	961	2550	1152	9.88	27.68	10.56	16.82		
7.	Pali	20074*	65270*	6380	146222	254	661	737	1105	214.80*	73.57*	28.77	103.00		
Sub Total		245549	462728	713524	819639	5762	8753	11419	11058	1161.10	1756.25	2095.79	3649.82		
8.	Alleppey	17133	9553	10729	59744	—	—	178	28	301	—	10.00	26.00	96.00	
9.	Paithan	24878	24382	22516	28000	—	—	11	164	693	34.02	26.25	34.76	148.00	
10.	Mandya	3483	3854	2567	6072	6	146	201	4.41	12.59	8.40	10.60			
11.	Surat	9324	36366	75361	89768	8	32	56	224	19.00	33.00	72.00	36.90		
12.	Sambalpur	17806	47753	59894	33589	44	155	1097	1196	159.98	167.72	218.08	258.00		
13.	Burdwan	—	5183	12703	49747	—	52	347	1277	—	37.09	137.35	545.74		
14.	Bhadrak	—	900	6500	17000	—	21	70	390	—	—	17.00	35.10		
15.	Cachar	—	—	2600	2395	—	—	108	371	—	—	9.00	13.40		
Sub Total		72624	127991	192875	286315	52	455	2016	4653	216.51	286.65	522.59	1143.74		
Grand Total		318173	590719	906399	1105954	5814	9208	13435	15711	1377.61	2042.90	2618.38	4793.56		

\* High consumption and increased area due to locust invasion.

## ANNEXURE VIII

*Credit limits sanctioned by the Research Bank of India & the Apex Banks and the drawals against them—1964-65*

(Rs. in lakhs)

S. No.	Name of the bank	Credit limit sanctioned for 1964-65		Maximum amount availed during 1964-65		
		Reserve Bank of India	Total of limits sanctioned by the RBI & Apex Bank	Apex Bank	R.B.I.	Total
1	2	3	4	5	6	7
1.	Kumbakonam	100.00	114.00	27.50	72.00	99.50
2.	Thanjavur	125.00	138.50	23.00	120.25	143.25††
3.	Eluru	186.00	196.00	24.30	106.55	130.85
4.	Krishna	125.00	135.00	4.95	91.45	96.40
5.	Rajahmundry	40.00	45.00	9.56	33.49	43.05
6.	Raipur	80.00	80.00	—	14.50	14.50
7.	Pali	33.00	42.00	1.50	26.00	27.50
8.	Ludhiana	50.00	70.00	20.00	50.00	70.00
9.	Burdwan	70.00	80.00	11.95	53.40	65.35
10.	Kalna-Katwa	24.00	40.00	9.35	24.00	33.35
11.	Cachar	—	32.37	10.04	—	10.04
12.	Sambalpur	67.50	75.00	1.88	28.68	30.56
13.	Mandyā	120.00	120.00	—	76.80	76.80
14.	Surat	60.00	60.00	—	20.00	20.00
15.	Alleppey	40.00	40.00	1.61	29.74	31.35
16.	Palghat	47.00	47.00	—	25.36	25.36
17.	Arrah-Buxar	20.00	50.00	33.98	8.85	42.83*
18.	Sasaram-Bhabua	25.00	50.00	30.45	4.76	35.21†
19.	Bhandara	—	170.00	13.00	Nil	13.00
20.	Aligarh	80.00	100.00	19.34	80.00	99.34
Total		1292.50	1684.87	242.41	865.83	1108.24

\* Includes outstandings of Rs. 4.65 lakhs as on 30.6.1964 carried over to 1964-65.

† Includes outstandings of Rs. 2.58 lakhs as on 30.6.1964 carried over to 1964-65.

†† The limit seems to have been raised to permit higher drawals.

**ANNEXURE IX**  
*Intensive Agricultural District Programme—Progress of Primary Cooperative Credit Societies*

District	No. of Societies	Membership (No. in lakhs)						Share Capital (Rs. in lakhs)						
		1961-62	1962-63	1963-64	1964-65	1961-62	1962-63	1963-64	1964-65	1961-62	1962-63	1963-64	1964-65	
1	2	3	4	5	6	7	8	9	10	11	12	13		
1. Thanjavur	1592	1633	1614	1614	2.89	3.68	4.07	4.34	47.04	75.47	83.02	92.67		
2. West Godavari	415	415	427	427	1.59	1.71	1.75	1.75	61.25	65.96	66.54	67.48		
3. Shahabad	1643	1732	1722	1724	0.62	0.70	0.73	0.78	8.43	11.32	14.89	16.34		
4. Raipur	1035	1032	1025	1026	1.44	1.15	1.30	1.43	33.30	40.00	45.35	46.97		
5. Aligarh	549	549	549	550	1.02	1.04	1.09	1.15	42.02	44.00	46.25	51.59		
6. Ludhiana	933	937	944	1016	1.05	1.10	1.16	1.35	51.13	59.38	68.09	84.60		
7. Pali	421	438	444	449	0.40	0.45	0.45	0.43	10.05	13.86	14.17	15.07		
Sub Total	6588	6736	6725	6806	8.71	9.83	10.58	11.23	253.22	310.59	338.31	374.72		
8. Alleppey	409	414	467	387	1.24	1.44	1.56	1.65	35.20	40.50	54.40	53.99		
9. Palghat	155	155	158	165	0.90	1.00	1.17	1.20	23.08	22.53	29.96	33.00		
10. Mandsa	292	292	308	396	0.70	0.71	0.78	0.92	23.58	25.94	29.76	28.00		
11. Surat	641	658	673	702	1.08	1.16	1.18	1.25	44.00	47.68	50.23	60.07		
12. Sambhalpur	594	443	173	133	0.44	0.93	0.88	0.88	20.45	24.06	24.66	20.91		
13. Burdwan	1026	1255	1260	1300	0.69	0.82	0.90	0.99	20.20	27.63	34.00	38.46		
14. Bhandara	794	794	794	794	0.76*	0.76	0.83	0.86	45.43*	45.43	48.16	52.26		
15. Cachar	821*	821	745	668	0.84*	0.84	0.86	0.83	10.00*	10.00	10.31	9.88		
Sub Total	4732	4832	4578	4545	6.65	7.66	8.16	8.58	221.94	243.77	281.48	296.58		
Grand Total	11320	11568	11303	11351	15.36	17.49	18.74	19.81	475.16	554.36	619.79	671.30		

\* Preceding/following year's figure repeated.

## ANNEXURE IX—Contd

	Deposits (Rs. in lakhs)						Loans Advanced (Rs. in lakhs)						Working Capital (Rs. in lakhs)					
	1961-62 1962-63 1963-64 1964-65			1961-62 1962-63 1963-64 1964-65			1961-62 1962-63 1963-64 1964-65			1961-62 1962-63 1963-64 1964-65			1961-62 1962-63 1963-64 1964-65			1961-62 1962-63 1963-64 1964-65		
	14	15	16	17	18	19	20	21	22	23	24	25						
1.	Thanjavur	18.84	33.59	33.69	46.90	281.23	382.40	425.73	324.70	415.63	513.34	580.61	499.04					
2.	West Godavari	26.33	21.85	26.49	25.89	332.02	325.67	240.50	190.53	416.31	480.31	346.68	346.68*					
3.	Shahabad	0.74	1.18	1.47*	1.47*	32.52	57.88	49.06	68.80	63.92*	63.92	69.08	69.08*					
4.	Rajpur	22.19	22.24	28.83	29.53	199.91	145.30	172.13	146.12	247.29	286.85	298.59	293.59*					
5.	Aligarh	7.45	9.38	9.92	12.18	140.85	112.41	115.96	180.93	51.30	162.89	194.18	249.02					
6.	Ludhiana	70.06	79.06	88.25	106.10	174.56	181.00	224.94	279.19	229.88	286.31	312.92	392.78					
7.	Pali	0.53	1.33	1.73	1.92	30.23	17.74	3.72	16.72	52.29	56.79	59.36	59.20					
	Sub Total	146.14	170.63	190.38	223.99	1191.12	1222.40	1232.04	1206.99	1477.01	1850.41	1856.42	1909.39					
	8.	Alleppey	2.80	16.60	36.43	43.37	46.37	100.61	86.06	103.24	77.80	122.25	261.07	186.15				
	9.	Paighat	43.83	43.83	53.57	67.00	108.77	109.43	129.12	175.00	141.82	143.60	176.77	209.00				
	10.	Mandya	1.55	1.55	1.81	2.49	86.57	64.26	83.81	84.36	232.35	232.35	116.33	125.63				
	11.	Surat	39.54	47.20	57.80	68.92	98.80	102.58	148.21	164.70	233.40	179.78	293.98	338.53				
	12.	Sambalpur	9.08	10.36	10.62	7.62	51.36	66.53	57.28	55.57	95.63	124.00	101.58	131.27				
	13.	Burdwan	2.77	6.25	8.00	14.27	75.03	105.52	114.76	130.60	100.29	136.99	165.26	204.16				
	14.	Bhandardara	4.73*	4.73	5.40	5.83	N.A.	91.72	76.64	84.15	226.87	226.87	200.81	201.10				
	15.	Cachar	0.42*	0.42	0.53	0.72	N.A.	7.57	5.06	9.81	59.52	59.52	85.08	54.41				
	Sub Total	104.72	130.94	174.16	210.22	466.90	648.22	700.94	807.43	1167.68	1225.36	1400.88	1450.25					
	Grand Total	250.86	301.57	364.54	434.21	1638.02	1870.62	1932.98	2014.42	2644.69	3075.77	3227.30	3359.64					

\* Preceding/following year's figure repeated.  
N.A. : Not Available.

ANNEXURE IX—CONTD.

*Intensive Agricultural District Programme—Progress of Cooperative Marketing Societies*

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## ANNEXURE XI

*Intensive Agricultural District Programme—Construction of Storage Godowns*

S. No.	District	Total No. of godowns needed to saturate the district	Godowns existing as on 30-6-65	Godowns under construc- tion as on 30-6-65	Godowns remaining to be con- structed as on 30-6-65
1	2	3	4	5	6
<i>A. First group of districts</i>					
1. Thanjavur		504	319	16	169
2. West Godavari		250	112	57	81
3. Shahabad		201	153	47	1
4. Raipur		289	157	120	12
5. Aligarh		154	89	10	55
6. Ludhiana		400	124	5	271
7. Pali		107	86	21	—
Sub Total :		1905	1040	276	589
<i>B. Second group of districts :</i>					
8. Alleppey		156	63	37	56
9. Palghat		150	60	17	73
10. Mandya		521	118	67	336
11. Surat		200	132	51	17
12. Sambalpur		353	241	10	102
13. Burdwan		273	103	52	118
14. Bhandara		558	138	200	220
15. Cachar		300	33	32	235
Sub Total :		2511	888	466	1157
Grand Total :		4416	1928	742	1746

## ANNEXURE XII

## Intensive Agricultural District Programme—Result Demonstrations (Composite)

S. No.	District	Crop	1960-61			1961-62			1962-63			1963-64			No. laid down 1964-65		
			Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	
1	2	3	4	5	6	7	8	9	10	11	12						
A. Group I districts																	
1. Thanjavur	Paddy	850	430	1289	644	1477	623	800	1932	552	1266						
2. West Godavari	Paddy	...	242	656	490	1403	939	293	50	423	200						
	Others	...	...	66	196	88	...	...	125	...	...						
3. Shahabad	Paddy	...	...	1455	...	2723	...	2365	...	1587	1146						
	Wheat	...	...	...	2916	81	2927	72	4	99	721						
	Others	...	...	...	...	...	...	...	...	...	...						
4. Raipur	Paddy	...	...	500	300	90	59	1150	14	1350	9						
	Wheat	...	...	100	...	...	...	...	46	...	91						
	Others	...	...	...	...	...	...	...	...	109	...						
5. Aligarh	Paddy	...	104	500	300	788	...	...	...	...	...						
	Wheat	...	3	373	386	1458	659	1617	1030	1767	790						
	Others	...	...	...	...	...	...	...	...	...	...						
6. Ludhiana	Paddy	...	...	19	1049	23	...	23	...	43	...						
	Wheat	...	...	1371	206	1493	169	1787	102	960	259						
	Others	...	...	...	...	...	...	...	...	...	...						
7. Pali	Wheat	...	...	116	59	439	221	336	222	...	175						
	Others	...	...	...	...	...	...	...	121	267	132						
		850	1299	5857	6767	10115	7221	8443	5523	7157	6477						
Sub Total		2149	12624	17336	17336	13966	13966	13634	13634								

## ANNEXURE XII.—CONTD.

B. Group II districts		1962-63		1963-64		1964-65		
		Kharif		Rabi		Kharif		
		7	8	9	10	11	12	
8. Alleppey	Paddy Others	Programme was not in operation during 1960-61 & 1961-62	...	88	...	146	44	189
9. Palghat	Paddy Others	—do—	...	83	...	128	186	...
10. Mandya	Paddy Ragi Others	—do—	75 57	87 8	165 105	175 21	242 293	230 53
11. Surat	Paddy Wheat Others	—do—	329 551 16	104 307	262 358	...	295 333	12 339
12. Sambalpur	Paddy Others	—do—	292 536	125 47	292 736	125 47	300 350	100 100
13. Burdwan	Paddy Others	—do—	444 ...	421 ...	910 18	841 ...	1493 ...	1078 ...
14. Bhandara	Paddy Others	Programme launched from Kharif, 1963-64	...	...	683 123	1101 132	1256 132	929 929
15. Cachar	Paddy Others	—do—	...	...	518 ...	457 ...	525 ...	400 400
			2300	1468	5193	4046	6087	4143
		Sub Total	3768	9239				
	Grand Total	2149	12624	21104	29205	10230	23864	

## ANNEXURE XIII

*A Intensive Agricultural District Programme—Results of Demonstrations,  
1963-64*

S. No.	Name of the District	Name of the crop	Average yield on demon- stration plot (Qtl./hect.)	Average yield on control plot (Qtl./hect.)	Percent- age in- crease of col. (4) over (5)
1	2	3	4	5	6
1.	Thanjavur	Paddy ( <i>Kuruvai</i> )	31.79	25.39	25
		Paddy ( <i>Samba</i> )	57.19	45.15	27
		Paddy ( <i>Thaladi</i> )	30.70	23.88	29
2.	West Godavari	Paddy (Kharif)	30.04	25.56	18
		Paddy (Rabi)	37.77	32.80	15
3.	Shahabad	Paddy	28.50	17.04	67
		Maize	33.32	15.31	118
		Wheat	16.47	6.69	146
		Gram	10.92	5.34	104
		Barley	14.00	6.79	106
		Potato	203.70	97.66	109
4.	Raipur	Paddy	32.78	20.06	63
5.	Aligarh	Bajra	12.82	7.16	79
		Maize	17.56	9.88	78
		Cotton	7.63	4.40	74
		Wheat	21.74	12.77	70
		Potato	104.33	50.08	108
		Sugarcane	642.64	389.52	65
6.	Ludhiana	Groundnut	19.33	13.63	42
		Paddy	33.94	22.72	49
		Hybrid Maize	39.12	23.84	64
		Sugarcane	62.23	40.57	53
		Wheat	28.90	20.48	41
		Gram	17.07	12.30	39
		Potato	152.25	117.67	29

## ANNEXURE XIII—(Contd.)

1	2	2	4	5	6
7.	Pali	Bajra	7.02	2.25	212
		Jowar	6.22	2.69	131
		Maize	16.75	10.28	63
		Wheat	16.35	10.23	60
		Barley	17.80	11.34	57
		Gram	6.45	3.21	101
8.	Alleppey	Paddy ( <i>Viruppu</i> )	28.06	19.41	45
		Paddy ( <i>Mundakan</i> )	36.90	27.32	35
		Paddy ( <i>Punja</i> )	37.30	26.75	39
		Tapioca	367.26	206.25	78
9.	Palghat	Paddy ( <i>Viruppu</i> )	32.06	22.53	42
		Paddy ( <i>Mundakan</i> )	36.80	27.26	35
10.	Mandyā	Paddy	46.73	37.89	23
		Ragi	10.84	7.76	40
11.	Surat	Paddy	34.53	25.96	33
		Groundnut	14.67	11.21	31
		Jowar	12.20	8.94	36
		Cotton	4.84	3.46	40
		Wheat	14.38	10.40	38
		Jowar (Rabi)	9.58	7.01	36
12.	Sambalpur	Paddy	29.84	20.92	43
		Groundnut	14.05	9.14	54
		Wheat	12.40	7.04	76
		Potato	87.59	55.53	58
13.	Burdwan	Paddy ( <i>Aman</i> )	34.26	29.12	18
		Paddy ( <i>Aus</i> )	25.76	21.49	20
		Jute	22.16	17.54	26
		Wheat	15.17	10.42	46
		Potato	165.05	127.16	30
14.	Bhandara	Paddy	46.16	27.84	66
		Wheat	7.88	5.09	55
		Jowar (Rabi)	6.82	3.66	86
15.	Cachar	Paddy ( <i>Aus</i> )	30.98	20.11	54
		Paddy ( <i>Sali</i> )	36.14	25.84	40

## ANNEXURE XIII—(Contd.)

## B. Intensive Agricultural District Programme—Results of Demonstrations, 1964-65

S. No.	Name of the District	Name of the crop	Average yield on demon- stration plot (Qtl./Hect.)	Average yield on control plot (Qtl./Hect.)	Percent- age in- crease of col. (4) over (5)
1	2	3	4	5	6
1.	Thanjavur	Paddy ( <i>Kuruvai</i> )	33.47	26.75	25
2.	West Godavari	Paddy	32.63	27.81	17
3.	Shahabad	Paddy Wheat	32.09 16.28	20.18 7.24	59 123
4.	Raipur	Paddy	27.49	20.25	36
5.	Aligarh	Maize Bajra Groundnut T. 26 Cotton 320F	17.61 12.62 20.65 12.03	9.76 7.83 13.04 7.06	80 61 58 70
6.	Ludhiana	Sugarcane Groundnut Hybrid Maize Maize ( <i>Desi</i> ) Cotton (American) Cotton ( <i>Desi</i> ) Potato Rice	78.30 20.13 34.75 20.03 10.72 11.12 222.30 34.31	48.68 12.72 19.22 14.23 7.43 7.95 148.20 20.08	61 58 81 41 44 40 50 71
7.	Pali	Bajra Jowar Maize ( <i>Bass-I</i> Selected) Maize ( <i>Hybrid-</i> <i>Ranjeet</i> )	6.86 6.10 17.50 21.66	4.03 3.06 11.50 11.49	70 99 57 89

## ANNEXURE XIII—(Contd.)

1	2	3	4	5	6
8.	Alleppey	Paddy ( <i>Viruppu</i> )	22.40	14.72	52
		Paddy ( <i>Mundakan</i> )	31.91	22.97	39
		Paddy ( <i>Punja</i> )	36.28	26.40	37
9.	Palghat	Paddy ( <i>Viruppu</i> )	36.06	25.70	40
		Paddy ( <i>Mundakan</i> )	39.69	28.85	38
10.	Mandyā	Paddy	44.68	34.51	29
11.	Surat	Paddy	33.76	25.69	31
		Jowar ( <i>Barani</i> )	10.84	7.76	40
		Jowar (Irrigated)	11.73	7.85	49
		Cotton ( <i>Barani</i> )	4.62	3.09	50
		Cotton (Irrigated)	5.58	3.46	61
		Wheat	13.88	10.37	34
		Groundnut	12.55	9.31	35
12	Sambalpur	Paddy	29.71	20.82	43
13.	Burdwan	Jute	23.47	18.43	27
		Paddy ( <i>Aus</i> )	29.07	23.76	22
		Paddy ( <i>Aman</i> )	33.30	27.91	19
		Wheat	16.20	11.73	38
14.	Bhandara	Paddy	35.44	23.71	49
		Wheat	8.79	5.24	68
		Jowar	8.65	4.82	79
13.	Cachar	Paddy ( <i>Sali</i> )	41.92	28.50	47
		Paddy ( <i>Aus</i> )	34.01	23.71	43

**ANNEXURE XIV**

*Intensive Agricultural District Programme—Expenditure*

(Rs. in lakhs)

States	Districts	Total Provision under the Third Five Year Plan	Actual Expenditure during						Total Col. (4) to Col. (8)
			1961-62	1962-63	1963-64	1964-65	Anticipated expenditure during 1965-66	8	
1	2	3	4	5	6	7	8	9	
<i>(A) First group of Districts</i>									
1. Madras	Tanjavur	150.00	14.81	16.35	20.79	31.32	24.84	108.11	
2. Andhra Pradesh	West Godavari	100.00	6.67	16.40	18.45	28.48	43.00	113.00	
3. Bihar	Shahabad	150.00	19.96	32.89	16.98	35.86	42.00	147.69	
4. Madhya Pradesh	Raipur	100.00	14.05	18.68	22.67	25.50	24.90	105.80	
5. Uttar Pradesh	Alegarh	150.00	26.044	37.877	18.477	34.00	28.00	144.398	
6. Punjab	Ludhiana	90.20	6.75	10.61	9.30	27.70	28.00	82.36	
7. Rajasthan	Pali	110.00	12.07	22.20	27.09	22.17	22.51	106.04	
	Sub Total	850.20	100.354	155.007	133.757	205.03	213.25	807.398	
<i>(B) Second group of Districts</i>									
8. Kerala	Alleppey & Palghat	150.00	3.76	9.59	22.68	21.48	27.64	85.15	
9. Mysore	Mandya	100.00	2.75	8.095	8.713	16.20	20.00	55.758	
10. Gujarat	Surat	148.36	7.33	8.19	11.27	28.65	26.74	82.18	
11. Orissa	Sambalpur	150.00	0.78	17.50	32.74	24.55	25.00	100.57	
12. West Bengal	Burdwan	150.00	—	8.16	25.25	30.00	50.00	113.41	
13. Maharashtra	Bhandara	95.00	—	4.67	14.21	24.79	22.19	65.86	
14. Assam	Cachar	100.00	—	0.88	11.75	17.97	17.50	48.10	
15. Jammu & Kashmir	6 Blocks-3 each in Jammu & Anantnag districts	50.00	2.12	3.31	1.76	19.30	11.61	38.10	
	Sub Total	943.36	16.74	60.395	128.373	182.94	200.68	589.128	
	Grand Total	1,793.56	117.094	215.402	262.130	387.97	413.93	1,396.526	



सत्यमेव जयते

## CHAPTER X

### THANJAVUR (MADRAS)

#### I

##### *Coverage*

10.1 The IAD Programme was launched in the district in the kharif season of 1960-61 in 317 villages selected from 23 blocks. The coverage had extended to 570 villages in 26 blocks during the year 1962-63 and further to 957 villages in 28 blocks in 1963-64. During the year 1964-65, the programme covered 1,557 out of 2,657 villages spread over all the 36 blocks in the district. The number of farm plans prepared increased from 36,683 in 1960-61 to 68,689 in 1962-63 and to 1,05,437 in 1963-64. During the year 1964-65, the number of farm plans prepared was 1,56,556. The farm plans prepared covered 12 percent, 23 percent, 35 percent and 52 percent of the total number of families in the district in the years 1960-61, 1962-63, 1963-64 and 1964-65 respectively. The cultivated area covered under farm plans also increased from 0.92 lakh hectares in 1960-61 to 1.75 lakh hectares in 1962-63, to 2.80 lakh hectares in 1963-64 and to 4.46 lakh hectares in 1964-65 representing about 13 per cent, 24 per cent, 39 per cent and 61 per cent respectively of the cultivated area in the blocks covered.

##### *Demonstrations*

10.2 Crop demonstrations involving all the recommended package of practices are laid out in farmers' fields with their full participation. The number of such demonstrations on paddy laid out since the inception of the programme came to 1280 in 1960-61, 1933 in 1961-62, 2100 in 1962-63, 2732 in 1963-64 and 1818 in 1964-65. The results of successful demonstrations are disseminated to farmers in the village through the media of printing press, as the demonstrator farmers are not likely to remember all the details to be able to give out their experience in full to their neighbours in the village. The results of these demonstrations conducted during 1961-62 to 1963-64 showed that the yields of paddy in the treated plots were higher by 24 to 27 percent in the case of *kuruvai* paddy, 26 to 47 per cent in the case of *samba* paddy and 24 to 30 per cent in the case of *thaladi* paddy as compared to the controls set up as foils. The increase in yields obtained in *kuruvai* paddy demonstrations during 1964-65 was also higher by 25 per cent as compared to controls. Analysis of the results of the 1964-65 demonstrations showed a return of Rs. 2.62 for each additional rupee spent on the package of practices.

10.3 Demonstrations in smaller numbers were also laid out to educate the farmers in the improved cultivation of cash crops like groundnut, banana, sugarcane and tobacco. In addition to the above demonstrations, some manurial demonstrations were also conducted. They were as many as 787 in 1963-64 and 248 in 1964-65.

#### *Fertilizers*

10.4 Special efforts had been taken to educate the farmers of Thanjavur in the use of chemical fertilisers. A number of fertilizer-festivals were organised in various parts of the district at the appropriate time, with a view to inducing more and more farmers to take to fertilizer-oriented cultivation. It is assessed that the festivals organised in the district during 1963-64 resulted in an increase of about 25 per cent in consumption of fertilizers as compared to the consumption during the corresponding season of 1962-63. Lack of provision for stocking supplies at a large number of centres within easy reach of farmers had a restraining influence on the off-take of fertilizers. The position has subsequently improved and now there are 380 primary cooperative societies undertaking distribution of fertilizers as agents of the Thanjavur Cooperative Marketing Federation and the Thanjavur District Cooperative Supply and Marketing Society. The increase in the off-take of chemical fertilizers in the district is indicated below:—

(Distribution of fertilizers in tonnes)

Year	Nitrogenous (in terms of Ammonium Sulphate)	Phosphatic (in terms of Super- phosphate)
	1	2
1960-61	17,460	13,574
1961-62	20,940	17,687
1962-63	26,326	28,422
1963-64	29,020	34,748
1964-65	41,899	45,562

It will be seen that during the period 1960-61 to 1964-65 the off-take of nitrogenous fertilizers increased by 140 per cent and that of phosphatic fertilizers, still more sharply, i.e., by about 236 per cent.

#### *Improved Seeds*

10.5 A pilot programme for producing quality seed in the district was started in 1962. One mechanical seed processing and cleaning unit was provided to each of the four State Seed Farms located in different parts of the district. Village seed farms were also set up close to these State Seed Farms so that effective supervision by the staff of the State Seed Farms could be possible. The seed produced from these farms was cleaned, processed, tested and sold to the cooperatives which undertook the distribution at the sowing time.

10.6 During the year 1964-65, 8,100 tonnes of improved paddy seeds were distributed as against 4,628 tonnes in 1963-64 and 1,271 tonnes in 1961-62. The area covered by improved seeds was 1.48 lakh hectares in 1964-65 as against 0.84 lakh hectares in 1963-64 and 0.23 lakh hectares in 1961-62.

10.7 A highly commendable achievement of the IADP in Thanjavur had been the evolving of an early maturing and high yielding paddy strain known as A.D.T.-27 at the Regional Research Station, Aduthurai. The strain is a cross between a Japonica type and an Indian type of paddy. It is an early maturing variety with a duration of about 105 days, is highly responsive to fertilizer application and yields about 5,228 kg. per hectare. The strain was raised on an area of 81 hectares in 1964-65 and the aggregate yield reported was 410 tonnes. During 1965 *kuruwai* season, 2,027 hectares were put under this variety. In view of its outstanding performance, a scheme for its multiplication and distribution to cover an area of 81,000 hectares in the Cauvery Delta by the end of 1966 has been sanctioned by the State Government. Another new strain of paddy evolved at the Aduthurai Research Station is *Selection 2701*. This variety has also become readily acceptable to the farmers because of its non-lodging quality and higher yields.

#### *Plant Protection*

10.8 In the extension work on plant protection, emphasis is laid on preventive measures against common pests of the various crops grown in the district for which suitable schedules of treatments are recommended. Good progress has been made in this field, and farmers have increasingly become aware of the need to protect their crops from the attacks of pests and diseases. Several farmers have purchased their own pest control equipments availing themselves of the 50 per cent subsidy offered by the State Government on cheap equipment. All the panchayats and most

of the cooperative societies have also purchased sprayers, dusters and seed treating drums for demonstration and hiring out. The pest control equipment in the district in 1964 including those available with departmental depots and *gramsevaks* numbered 120 power sprayers, 75 charge pumps, 3,086 hand operated sprayers, 1,215 hand dusters and 625 seed treating drums.

10.9 The area covered by plant protection measures in the district including rodent control has steadily increased from 0.12 lakh hectares in 1960-61 to 0.64 lakh hectares in 1962-63, 2.82 lakh hectares in 1963-64 and further to 3.53 lakh hectares in 1964-65. Large scale campaigns were also conducted every year for the eradication of field rats. During the year 1963-64 control measures were adopted in an area of 2.08 lakh hectares killing about 15 lakhs rat while during 1964-65, 1.47 lakh hectares were tackled killing about 11.42 lakh rats as against 0.10 lakh hectares covered and 1.8 lakh rats killed in 1961-62. The offtake of pesticides had also increased from 271 tonnes in 1960-61 to 936 tonnes in 1962-63, 1,146 tonnes in 1963-64 and 2,675 tonnes in 1964-65. Pre-treatment of seeds with organo-mercuric compounds had also become popular. About 4,741 tonnes of seeds were treated in 1964-65 in the package area as against 1,962 tonnes of seed treated in 1963-64, 584 tonnes in 1962-63 and 503 tonnes in 1961-62.

#### *Agricultural Implements*

10.10 An Agricultural Implements Workshop is under construction at Tiruvarur. This workshop is intended for the following: (a) to carry out educational and developmental work in agricultural implements as applicable to particular areas, (b) to supervise field testing of implements, (c) to produce sufficient number of prototypes of new implements for demonstrations, (d) to service the vehicles such as trucks, jeeps, tractors, etc., employed in the programme, and (e) to train village artisans in development and repair of implements and farmers in their operation. The Agricultural Engineer incharge of the workshop is at present engaged in collecting preliminary data regarding improved local implements in use in the district. The tractor workshop which was in existence in Tiruvarur has also been placed under the charge of the Agricultural Engineer. There are 26 tractors at present with the workshop and 10 more have been ordered so that each one of the 36 blocks will have one tractor. The tractors are being hired out to cultivators for ploughing and transporting of agricultural requisites and threshing ear-heads.

10.11 The workshop has designed an implement for placing fertilizers in puddled soil. Work has been taken up for designing puddlers, inter-cultivators and levelling board for operation with tractors, paddy

thresher operated manually with power, and seed drill for sowing paddy in dry lands.

#### *Soil Testing Laboratory*

10.12 Soil samples are collected from the area covered by the programme at the rate of one sample for every 11 hectares. They are analysed at the Soil Testing Laboratory, Aduthurai. The results of soil analysis and manurial recommendations are communicated to the farmers for adoption. A schedule of fertilizer recommendations is drawn up for each block based on the results of tests. Fertilizer recommendations are also made for individual farmers based on the results of analysis of soil samples taken from their holdings. Consequent on a large number of soil samples having been analysed, it is now found possible to offer fertilizer recommendations on village basis. Based on the soil analysis, district, block and village fertility maps have also been prepared. The number of soil samples sent for analysis, samples tested and recommendations made thereon are as under :—

Year	No. of samples sent for analysis	No. of samples tested	No. of recommendations
1	2	3	4
1960-61	755	610	610
1961-62	11,683	8,332	8,332
1962-63	12,634	10,702	10,340
1963-64	11,147	10,084	7,855
1964-65	19,736	13,405	13,405

#### *Water Use and Management*

10.13 Though water is available in plenty in Thanjavur district, the need for proper management of it is keenly felt. Hence a scheme has been sanctioned for the study of proper use of irrigation water at the four State Seed Farms in the district. Blocks of 2 hectares each have been selected for conducting trial-cum-demonstrations in water use and 1/5th hectare plots have been laid out with 'V' notches to regulate the flow of irrigation water. Trials with varying depths of water over the field at varying intervals of irrigation are conducted on these plots to find out the most suitable combination of irrigation intensity and irrigation interval.

*Cooperatives*

10.14 The number of primary credit societies has witnessed a rise from 1,102 in 1959-60 to 1,614 in 1963-64. There had been no addition to their number in 1964-65. Their membership increased from 2.74 lakhs in 1959-60 to 4.07 lakhs in 1963-64 and 4.34 lakhs in 1964-65 and the share capital from Rs. 40.65 lakhs in 1959-60 to Rs. 83.02 lakhs in 1963-64 and to Rs. 92.67 lakhs in 1964-65. The total amount of loans advanced increased from Rs. 213.81 lakhs in 1959-60 to Rs. 382.40 lakhs in 1962-63 and Rs. 425.73 lakhs in 1963-64 and declined to Rs. 324.70 lakhs in 1964-65. The percentage of overdues had, however, registered a rise from 5 per cent in 1959-60 to 20 per cent in 1962-63, 28 per cent in 1963-64 and 37 per cent in 1964-65.

10.15 The coverage of agricultural families by cooperatives had increased from 56 per cent at the commencement of the programme to 80 per cent in 1962-63 and to 85 per cent in 1964-65 while cent per cent coverage of villages had been achieved. The table below shows that there is an increase in the disbursement of loans in kind.

Year	Total Short- term loans advanced (Rs. in lakhs)	Percent- age of loans in kind	Percentage of loans disbursed in terms of		
			Ferti- lizers	Pesticides	Improved seeds
1	2	3	4	5	6
1961-62	71.23	25.2	20.7	1.3	2.6
1962-63	91.47	51.4	41.2	4.4	2.9
1963-64	127.38	38.0	35.0	2.0	0.8
1964-65	215.24	44.3	—	—	—

10.16 The rapid rise in the quantum of short-term loans given by the cooperative societies to the farmers has been made possible by taking a number of measures. In order to enable the societies to borrow funds to the required extent and provide loans to the agriculturists in an adequate measure, the bye-laws of all the societies brought under the programme have been suitably amended to provide for an increase in the maximum borrowing power of the society from 1/8th to 1/5th of the net assets of

members and individual maximum borrowing limits of the members from Rs. 3,000 to Rs. 5,000. Loans up to Rs. 1,000 are now given on personal surety and loans exceeding Rs. 1,000 are given on mortgage of immovable properties. Production loans are made available to the various categories of farmers like owners, owner-cum-tenants, tenants with lease-deeds and tenants on oral lease as per requirements indicated in their farm plans. In order to enable the credit societies implementing the programme to issue loans to members without delay, each society is sanctioned a cash credit accommodation of Rs. 10,000 by the Cooperative Central Bank. The societies are permitted to disburse loans from the cash credit account immediately when the members require funds and to recoup the drawn portion of the cash credit by sending short term applications to the Central Banks thereafter.

10.17 There were 16 primary marketing societies functioning in the district during 1964-65 as also in 1959-60. However, significant progress has been recorded during the last 5 years by way of increase in membership, share capital and value of agricultural produce handled by these societies. The membership of these societies increased from 13,684 in 1959-60 to 19,177 in 1962-63, 25,774 in 1963-64 and 26,608 in 1964-65. The share capital increased from Rs. 4.04 lakhs in 1959-60 to Rs. 6.78 lakhs in 1962-63, Rs. 8.20 lakhs in 1963-64 and Rs. 8.21 lakhs in 1964-65. Till 1961-62 the marketing societies were doing very little marketing business and there was no effective linking of credit with marketing. Since January, 1962 the two District Marketing Societies were purchasing paddy on outright purchase basis from the members of credit societies in the package areas through the agency of primary marketing societies. The value of agricultural produce, largely paddy, handled by the primary marketing societies increased from Rs. 18.32 lakhs in 1961-62 to Rs. 26.60 lakhs in 1963-64 and then steeply to Rs. 97.82 lakhs in 1964-65.

#### *Storage Godowns*

10.18 As against 504 cooperative godowns needed to saturate the district, 319 godowns existed on 30th June, 1965 and 16 were under construction. During the year 1964-65, 31 godowns were added to the number existing at the end of June, 1964.

## II

#### *Results of Agronomic and Agro-Economic Surveys—1961-64*

10.19 Agronomic and Agro-Economic Surveys were initiated in the district in 1961-62 and since then these are being repeated annually. These surveys covered all the 36 blocks in the district and also the 5 control blocks selected from the adjoining districts. The control blocks were Orathur,

Bhuvanagiri and Portonovo in South Arcot district and Tirumanur and Manikandam\* in Tiruchirapalli district. Each year a random sample of 1200 cultivators at the rate of 8 per village was studied. The field work was conducted by a team of 11 whole-time investigators and their work was supervised by one Statistical Officer and one Statistical Assistant.

#### *Holding size*

10.20 For the purpose of analysis, the cultivators in the sample have been classified into four holding size groups, very small (less than 1 hectare), small (1-2 hectares), medium (2-4 hectares) and large (greater than 4 hectares). The results, averaged over the three years, indicated that in Thanjavur district about 45 per cent of the cultivators' holdings were very small, 30 per cent small, 16 per cent medium and the remaining 9 per cent large. In respect of total cultivated area, about 36 per cent was accounted for by the large size holdings, while, only 14 per cent was in the very small size class. The share of the small and medium size classes in the total cultivated area was about 25 per cent each.

10.21 About three-fifths of the cultivators in the sample in the district were found to be depending on their own land for cultivation, while nearly one-fifth were dependent entirely on leased land. The remaining one-fifth of the cultivators were cultivating partly their own land and partly leased-in land. It was observed that 20 per cent of the total cultivated land in the district was under tenancy.

#### *Cropping pattern*

10.22 It was observed that about 86 per cent of the gross cropped area was under paddy. Other foodgrain crops including pulses accounted for nearly 4 per cent of the gross cropped area. Groundnut was the chief cash crop grown in the district, but its share was only of the order of 3 per cent. Green manure crops (*kolungi* and *pillipesera*) accounted for about 5 per cent of the gross cropped area.

10.23 A study of the cropping pattern followed in different holding sizes indicated that the proportion of area under *samba*, the long duration paddy crop, increased with the size of holdings (Annexure 10.1). During the year 1963-64, while 37 per cent of the gross cropped area in very small holdings was under this crop, the corresponding percentage for the large holdings was as high as 59. On the other hand, the proportion of area under *thaladi* paddy crop decreased from 21 per cent in the very small holdings to 10 per cent in the large holdings. Area under foodgrains other than paddy (small millets and pulses) constituted only 1 per cent of the gross

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\* Lalgudi block in Tiruchirapalli was one of the control blocks originally selected, but this was later replaced by Manikandam block in the same district.

cropped area in large size holdings as against 5 per cent in all the other holding sizes.

#### *Distribution of production supplies*

10.24 Improved seeds of paddy, nitrogenous and phosphatic fertilizers, plant protection chemicals such as B.H.C., Folidol, Zinc phosphide; etc., and improved implements were the chief items of production-supplies made available to the cultivator under the intensive programme in the district. There was some increase in the percentage of cultivators receiving improved seed, but it was only of the order of 10 per cent even in the year 1963-64. The proportion of cultivators receiving nitrogenous fertilizers did not show any appreciable increase from year to year. But the percentage of recipients of phosphatic fertilizers and that of mixed fertilizers steadily increased from year to year. During the year 1961-62, the first year of the Survey, only about 25 per cent of the cultivators received phosphatic fertilizers, while in 1963-64 the corresponding percentage was of the order of 40. Similarly, the percentage of cultivators who received mixed fertilizers increased from 5 to 10. The percentage of cultivators who received pesticides for plant protection stood at 22 in the year 1961-62. This did not show any appreciable increase in the subsequent years. Distribution of improved agricultural implements was confined to less than 5 per cent of the farmers for all the years.

10.25 Comparison of the percentage of recipient cultivators of different holding size classes in respect of the various items of production supplies indicated significant increase with holding size for most of the items. During the year 1963-64, 49 per cent and 23 per cent of the very small size holdings received nitrogenous and phosphatic fertilizers respectively, while the corresponding figures for large size holdings were 74 per cent and 62 per cent. Again during the same year 3 per cent of the very small size holdings obtained zinc phosphide (rat poison), while 17 per cent of the large size holdings secured this plant protection chemical.

#### *Distribution of credit*

10.26 Information on credit obtained by cultivators is being collected from the year 1962-63 in this district as well as in other districts. Although loan received by cultivators from co-operatives was in many instances, partly in cash and partly in kind, the entire loan was recorded as cash loan. Data collected during the years 1962-63 and 1963-64 indicated that out of the total number of loans taken by cultivators in the district for agricultural purposes, about 80 per cent was secured from co-operative societies or Government. This percentage did not show any significant change with the holding size. Other important source of credit in the district was the money-lenders. This agency accounted for nearly 10 per cent of the total

loans taken for agricultural purposes. In respect of loans for non-agricultural purposes, money-lender was the chief creditor accounting for nearly 70 per cent of the total loans availed of by the farmers.

10.27 The amount of loan per cultivator obtained from all sources in the year 1963-64 averaged to Rs. 242 (Annexure 10.2). This was higher than the amount of loan availed of during the year 1962-63, mainly due to an increase in the percentage of cultivators who availed of loan for agricultural purposes. As against 42 per cent of the cultivators who availed of loans for agricultural purposes during the year 1962-63, 74 per cent of the cultivators sampled in the year 1963-64 availed of such loan. In the case of non-agricultural loans also there was some increase but there was considerable variation in the amount of non-agricultural loans taken by different cultivators, the highest single loan taken being of the order of Rs. 10,000.

10.28 A study of the relationship of loan taken and the size of cultivators' holding indicated that the amount of loan taken increased with the holding size. In the year 1963-64 the cultivators having very small holdings took, on an average, a loan of Rs. 120 and the amount increased to Rs. 181 per cultivator for the next higher size class (small holding). The average amount of loan taken per cultivator in the medium and large holding size classes were respectively Rs. 411 and Rs. 754. The loan per hectare of the cultivated area, however, decreased with the increase in size of holdings. It ranged from Rs. 218 for very small holdings to Rs. 110 for large holdings.

#### *Use of manures and fertilizers*

10.29 Thanjavur is one of the advanced districts of the country in respect of the use of manures and fertilizers. The results of the surveys indicated that almost all the farmers in the district applied organic manures or chemical fertilizers to their crops. During 1961-62, the first year of the survey, about 70 per cent of the cultivators applied chemical fertilizers; their proportion increased to 75 per cent in 1963-64. In the kharif season, chemical fertilizers were applied mostly with organic manures.

10.30 A study of the manurial and fertilizer practices followed in holdings of different sizes indicated that the percentage of cultivators using chemical fertilizers increased with size of holdings. During kharif 1963-64 about 57 per cent of the cultivators having holdings of one hectare or less used fertilizers, while the corresponding figure for cultivators having large holdings was 74 per cent. Percentage of cultivators using farm yard manure as well as green manure in addition to chemical fertilizer also increased steadily from 30 per cent for very small holdings to 51 per cent for large holdings in the same season.

*Crop-wise consumption of fertilizers and manures*

10.31 Use of manures and fertilizers in the district was almost exclusive to paddy crop. The consumption of fertilizers to other crops such as plantains and oilseeds was less than 2 per cent of the total consumption in the district. The total consumption of nitrogenous as well as phosphatic fertilizers in the district had increased during the successive years of the survey. Nitrogenous fertilizers in terms of ammonium sulphate increased from about 21,000 tonnes in 1961-62 to 29,000 tonnes in 1963-64, while phosphatic fertilizer consumption increased from 18,000 to about 35,000 tonnes during the same period. There was no appreciable change in the relative consumption of fertilizers in respect of the three paddy crops between the years 1961-62 and 1962-63, but in the year 1963-64 percentage consumption for *thaladi* crop was higher than in the earlier two years. Out of the total consumption of nitrogenous fertilizers during the year 1963-64 the share of the three paddy crops, *kuruwai*, *samba* and *thaladi* were 24 per cent, 54 per cent and 22 per cent respectively. The corresponding figures for phosphatic fertilizer were 15 per cent, 72 per cent and 12 per cent respectively.

*Percentage area benefited by manures and fertilizers and rates of application*

10.32 About 75 per cent of the area under *kuruwai* and *samba* crops during the year 1961-62 received farm yard manure and this rose to 85 per cent or more during the years 1962-63 and 1963-64. While percentage area under *samba* paddy crop benefited by application of nitrogenous as well as phosphatic fertilizers increased from 1961-62 to 1962-63, it declined for *kuruwai* and remained at more or less same level for *samba* during 1963-64 (Annexure 10.4). Area under *thaladi* crop, benefited by phosphatic fertilizer also increased during the period, but there was a slight decline in the percentage area under that crop benefited by nitrogenous fertilizer. During 1963-64 mixed fertilizer gained very much popularity, particularly for *thaladi* paddy crop raised in the rabi season.

10.33 The rates of application of nitrogenous fertilizers (average rate applied to the benefited area) to all the paddy crops were generally below the recommended rate (168 kg. per hectare). The average rate applied during the year 1963-64 was nearly 60 per cent of the recommended rate. Phosphatic fertilizer application was, however, nearly at the recommended rate for all paddy crops. Relative progress achieved in the consumption of nitrogenous and phosphatic fertilizers towards the goal of saturation of the entire area at the present recommended rates of application is indicated in the table below:

*Level of consumption of fertilizers on paddy crop in the district expressed as percentage of the saturation limit (to fertilize, at recommended rates, the entire crop area in the district).*

Year	1961-62	1962-63	1963-64	1964-65*
Level of consumption of nitrogenous fertilizer as percentage of the saturation limit.	18.4	29.2	33.6	44.6
Level of consumption of phosphatic fertilizer as percentage of the saturation limit.	24.0	32.7	40.0	36.4

\*Provisional

It may be seen that while there is steady progress, there is scope for at least doubling the fertilizer consumption in the district.

#### *Holding size and use of fertilizers*

10.34 Use of nitrogenous and phosphatic fertilizers in the district was positively associated with size of holdings. Percentage area benefited by the application of nitrogenous as well as phosphatic fertilizers was higher in the large size holdings than in the very small and the small size holdings as could be seen from the table below. The average rate of application, particularly of phosphatic fertilizer, showed a negative association with size of holdings, i.e., it decreased with the increase in the size of holdings.

#### *Percentage area under paddy benefited by nitrogenous fertilizers and average rate of application in holdings of different sizes*

	Year	Very Small	Small	Medium	Large
Percentage area benefited in 1962-63		50	56	53	65
,,	1963-64	49	52	49	64
Average rate of application of ammonium sulphate or equivalent (kg./hect.)	1962-63	101	78	96	73
	1963-64	105	84	80	91

*Percentage area under paddy benefited by phosphatic fertilizers and average rate of application in holdings of different sizes.*

	Year	Very Small	Small	Medium	Large
Percentage area benefited in	1962-63	25	31	43	58
,,	1963-64	21	33	42	53
Average rate of application of super phosphate (kg./hect.)	1962-63	160	116	123	119
	1963-64	182	152	144	128

### III

*Results of crop-cutting surveys conducted during 1961-65*

10.35 Crop cutting surveys were considered an integral part of the assessment programme of the IADP. About 300 crop-cuts in the IADP district and about 75 crop-cuts in the control area were planned annually on each of the principal crops of the area from the inception of the programme. In this district crop-cuts were planned on three paddy crops namely, *kuruwai*, *samba* and *thaladi*. These crops together accounted for about 85 per cent of the gross cropped area in the district. The results based on these crop-cuts are given in Annexures 10.6 to 10.9.

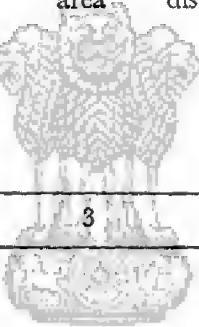
10.36 For a proper assessment of the changes in the yield rates of principal crops grown in the district, brought about through the operation of the intensive programme, it is useful to study comparative yield rates in successive years for the IADP district as well as for some other comparable areas. The problem is two-fold. In the first instance, variation due to weather is to be allowed for. Secondly, we are chiefly interested in finding out how the IADP areas fare in comparison with similarly situated areas where normal developmental activities are in progress. For a rigorous study of the relative trends in the yield rates of crops in the IADP district and in other comparable areas, time series data for a number of years will have to be collected. The results of the study based on only 4 years' data should be considered as tentative.

10.37 Although there was notable fluctuation from year to year during the period of operation of this programme in the district, the average yield rate increased from 15.0 quintals per hectare during 1958-61 to 16.1 quintals per hectare during 1961-65. Increase in the remaining part of the State was of a lower order.

10.38 Increase in the yield rates in the district was also examined after making adjustment for seasonal effect as also the normal developmental activities by utilizing data of crop yield in the control blocks, adjoining districts and the State (excluding Thanjavur district) through the co-variance technique. Although the adjusted yield rates for the three crops taken together were not very much different from the non-adjusted yield rates, perceptible trend was observed for *samba* and *thaladi* crops when adjusted, utilizing the data for control blocks.

The results are given in the table below :

*Average yield of rice in Thanjavur district and comparable areas*

Year	Average yield of rice in quintal/hectare in					Average yield in IADP District adjusted by using the data of control areas†
	Thanjavur district	Control area	Adjoining districts*	Whole State excluding IADP distt.	5	
1	2	3	4	5	6	
Average for 3 yrs.						
1958-61	15.0	N.A. 	13.3	14.8	—	
1961-62	17.0	17.1	13.1	14.9	16.9	
1962-63	15.2	17.4	13.2	15.0	14.9	
1963-64	14.8	16.3	13.8	15.0	15.1	
1964-65	17.3	16.8	13.5	14.8	17.6	

\* Adjoining districts are South Arcot, Ramanathapuram and Tiruchirapalli.

† No adjustment could be done by utilising the data relating to adjoining districts or whole State excluding IADP district since estimates of regression coefficients to be used for adjustment were negative in both the cases.

N.A. Not Available.

*Participants vs. non-participants*

10.39 The results presented in Annexure 10.7 show that the proportion of participants among those whose fields were selected for crop-cutting surveys did not show any increase from 1962-63 to 1963-64. In the year 1964-65, the proportion of participants increased substantially for *kuruwai* and *thaladi* crops, while for *samba* crop the increase was only marginal.

10.40 A comparison of the yield rates for different crops obtained by participant and non-participant cultivators in the various years indicated that the difference between the two groups of cultivators decreased as the proportion of participants increased in later years. This could be explained by the fact that in the initial years relatively more progressive farmers participated in the programme. As the coverage under the intensive programme increased, less progressive farmers were also brought within its fold and this resulted in a decrease in the difference between participant and non-participant cultivators.

*Effects of agronomic practices on yield rates*

10.41 Over 95 per cent of the paddy crop in the district was grown under irrigated conditions. Further, an equally large percentage of fields were receiving organic manure or chemical fertilizer singly or in combination with each other. Thus the standard of practices followed in the district may be considered as of a higher order than those found in most of the other districts in the country. Fertilizer application was adopted in about 41 per cent to 80 per cent of the fields under various paddy crops. The average yield rate in the fields benefited by fertilizer application was generally higher than that in the fields not so benefited for all the paddy crops (Annexure 10.8). The increase in the yield rate obtained in the fertilized fields ranged from 1.3 quintals of rice per hectare for *samba* crop to 2.5 quintals of rice per hectare for *thaladi* crop. As the results are based on survey data this difference need not necessarily be due to the application of fertilizer alone. Other agronomic practices might have also been associated with the use of fertilizer.

10.42 As regards contribution of the improved seeds, about 50 per cent to 60 per cent of the paddy fields in different years were reported to be sown with improved strains. ADT3 and ADT 20 were the popular strains for the *kuruwai* crop, while CO 25 was the main improved strain adopted for both *samba* and *thaladi* crops. The average yield rates for these improved varieties were about one to two quintals of rice per hectare higher than those for local varieties. It was observed that improved seeds distributed through the Government or cooperative agencies gave higher yields than those distributed through non-institutional sources (Annexure 10.9).

10.43 Use of insecticides and pesticides were reported in about 15 per cent of fields selected for crop cutting experiments during 1964-65.

## ANNEXURE 10.1

*Cropping pattern followed in the cultivator's holdings sampled in Thanjavur district*

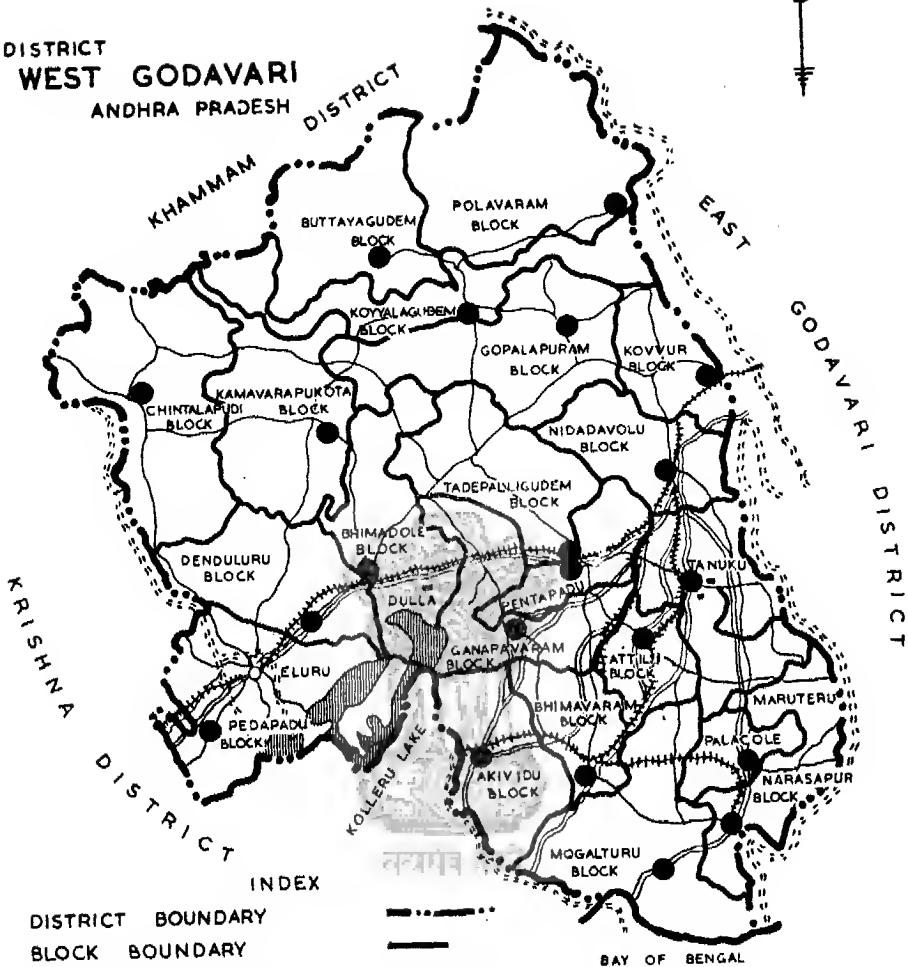
Name of crop	Percentage area under various crops*				
	Very small holdings	Small holdings	Medium holdings	Large holdings	Pooled over all holdings
1	2	3	4	5	6
Rice ( <i>kuruwai</i> )	27	20	18	23	21
Rice ( <i>samba</i> )	37	46	53	59	50
Rice ( <i>thaladi</i> )	21	16	14	10	15
Other food grains	5	5	5	1	4
Total food grains	90	87	90	93	90
Groundnut	4	3	2	2	3
Other cash crops	1	1	+	+	+
Tree and fruit crops	1	2	1	1	1
Other crops (including green manure and fodder crops)	4	7	7	4	6
Total non-food-grain crops	10	13	10	7	10
Total all crops	100	100	100	100	100

\*Average for 3 years 1961-62 to 1963-64

+ less than 0.5%

DISTRICT  
**WEST GODAVARI**  
ANDHRA PRADESH

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↑

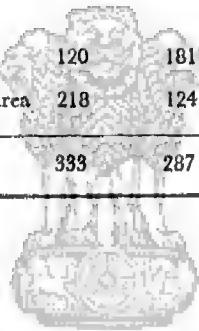


- DISTRICT BOUNDARY  
BLOCK BOUNDARY  
DISTRICT HEADQUARTER  
BLOCK HEADQUARTER  
RAILWAY  
ROAD  
RIVER  
CANAL  
AGRI. RESEARCH STATION

## ANNEXURE 10.2

*Average amount of loan borrowed per sampled cultivator in Thanjavur district from different agencies.*

Agency 1	Amount (rupees) borrowed per sampled cultivator				
	Very small holdings 2	Small holdings 3	Medium holdings 4	Large holdings 5	Pooled over all holdings 6
Govt. or co-operative	66	104	221	528	141
<b>Other agencies:—</b>					
(i) For agricultural purposes	18	37	78	84	41
(ii) For non-agricultural purposes	36	40	112	142	60
(iii) Total	54	77	190	226	101
<b>Pooled over all agencies:—</b>					
(i) per cultivator	120	181	411	754	242
(ii) per hectare of cultivated area	218	124	149	110	140
Number of sampled cultivators	333	287	171	58	849



## ANNEXURE 10.3

*Percentage crop-unit consumption of different organic manures and chemical fertilizers in Thanjavur district.*

Name of the crop	Percentage of quantities consumed to the total					
	FYM or compost		Nitrogenous fertilizers		Phosphatic fertilizers	
	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64
1	2	3	4	5	6	7
Rice ( <i>Kuruvai</i> )	17	26	34	27	24	16
Rice ( <i>Samba</i> )	70	68	63	51	53	72
Rice ( <i>Thaladi</i> )	7	1	2	20	17	12
Others	6	5	1	2	1	—
Total quantity distributed (tonnes)	952300	918400	20940	26326	29020	17687
						28422
						34748

F.Y.M.=Farm-yard manure

*Note:—* The quantities of chemical fertilizers refer to the quantities distributed in the district during the years while those of FYM refer to the quantities consumed during the years as estimated from the agronomic and agro-economic enquiry.

**ANNEXURE 10.4**  
*Percentage area benefited by manures and fertilizers and average rate of application for principal crops grown in the sampled cultivator's holdings in Thanjavur district*

Crop	Kind of manure or chemical fertilizer	1961-62			1962-63			1963-64		
		percent area benefited	Average rate of appli- cation (Q/H)							
1	2	3	4	5	6	7	8			
Rice (Karuvai)	F.Y.M. or compost	75	196	99	208	89	296			
	Nitrogenous fertilizer (in terms of ammonium sulphate)	56	1.64	70	0.91	56	0.99			
	Phosphatic fertilizer (in terms of single super phosphate)	26	1.64	45	1.27	27	1.49			
	Fertilizer mixture	10	1.78	5	0.99	12	2.94			
Rice (Samba)	F.Y.M. or compost	76	178	97	177	82	197			
	Nitrogenous fertilizer (in terms of ammonium sulphate)	27	1.42	52	0.81	50	0.80			
	Phosphatic fertilizer (in terms of single super phosphate)	27	1.64	44	1.18	48	1.39			
	Fertilizer mixture	4	1.14	2	0.67	8	1.12			
Rice (Thaladi)	F.Y.M. or compost	21	269	10	109	15	150			
	Nitrogenous fertilizer (in terms of ammonium sulphate)	69	0.98	60	0.81	66	0.93			
	Phosphatic fertilizer (in terms of single super phosphate)	21	1.54	37	1.50	28	1.57			
	Fertilizer mixture	13	1.34	7	0.98	26	1.57			

$\frac{Q/H}{F.Y.M.}$  = Quintals per Hectare.  
 $\frac{Q/H}{F.Y.M.}$  = Farm yard manure.

**ANNEXURE 10.5**  
*Average yield of rice in Thanjavur district and comparable areas (Quintals per Hectare)*

Crop	Year	Thanjavur district		Comparable areas		Adjusted yield in Thanjavur district using results in control area*	
		Average yield †	S.E.	Control area	Adjoining districts‡		
1	2	3	4	5	6	7	8
<b>Rice (<i>Kuruvai</i>)</b>	1961-62	16.7	0.42	17.8			
	1962-63	17.4	0.46	16.5			
	1963-64	16.2	0.33	15.6			
	1964-65	17.6	0.29	17.1			
	Average for 4 yrs. 1961-65	17.0	0.19	16.6			
<b>Rice (<i>Samba</i>)</b>	1961-62	17.6	0.40	17.2			
	1962-63	15.2	0.34	18.0			
	1963-64	15.0	0.33	17.0			
	1964-65	17.8	0.44	16.8			
	Average for 4 yrs. 1961-65	16.5	0.19	17.3			
<b>Rice (<i>Thaladi</i>)</b>	1961-62	17.0	0.46	16.1			
	1962-63	14.0	0.30	15.6			
	1963-64	14.2	0.30	15.0			
	1964-65	16.9	0.37	16.2			
	Average for 4 yrs. 1961-65	15.5	0.18	15.7			
<b>Rice (Overall)</b>	1961-62	17.0	0.25	17.1	13.1	14.9	16.9
	1962-63	15.2	0.21	17.4	13.2	15.0	14.9
	1963-64	14.8	0.19	16.3	13.8	15.0	15.1
	1964-65	17.3	0.25	16.8	13.5	14.8	17.6
	Average for 4 yrs. 1961-65	16.1	0.11	16.9	13.4	14.9	16.1

*Note:*—

- \* No adjustment could be done utilising data relating to adjoining districts or whole State excluding IADP district since estimates of regression coefficients to be used for adjustment were negative in both cases.
- † Average yield figures of Thanjavur district for rice (*Kuruvai*) and rice (*Samba*) crops for all the years are those based on IADP series only. Average yield figures for rice (*Thaladi*) and rice (Overall) for all the years are those of integrated series.
- ‡ Adjoining districts are South Arcot, Ramanathapuram and Tiruchirappalli.

**ANNEXURE 10.6**  
*Area, average yield and total production of rice in Thanjavur district and Madras State*

Year	Thanjavur district				Madras State			
	Area ('00 hectares)	Average yield (Q/H)	Production ('00 tonnes)	Value of production (Rs. in Lakhs)	Area ('00 hectares)	Average yield (Q/H)	Production ('00 tonnes)	
1	2	3	4	5	6	7	8	
Average for 3 years (1958-61)	5742	15.0	8606	5202	23406	14.8	34729	
1961-62	5978	17.0	10163	6143	25378	15.4	39075	
1962-63	5997	15.2	9115	5509	25657	15.0	38610	
1963-64	5998	14.8	8877	5366	26195	14.9	39169	
1964-65	6070	17.3	10201	6347	26377	15.3	40483	
Average for 4 years (1961-65)	6011	16.1	9664	5841	25502	15.2	39334	

$Q/H$ =Quintals per Hectare.

*Note:—* Value of production was worked out on the basis of the harvest price in 1960-61.

## ANNEXURE 10.7

*Average yield of rice in quintals per hectare in the fields of participant and non-participant cultivators in Thanjavur district.*

Crop	Year	Percentage of participant cultivators	Average yield in quintals per hectare	
			Participant cultivators	Non-parti- cipant cultivators
1	2	3	4	5
Rice ( <i>Kuruvai</i> )	1962-63	33	17.5	16.8
	1963-64	29	16.5	16.1
	1964-65	55	17.5	17.1
Rice ( <i>Samba</i> )	1962-63	31	16.4	15.0
	1963-64	28	16.5	14.4
	1964-65	35	17.7	17.7
Rice ( <i>Thaladi</i> )	1962-63	32	15.2	13.1
	1963-64	28	13.7	12.7
	1964-65	52	17.1	15.3

**ANNEXURE 10.8**  
*Percentage distribution of fields sampled in Thanjavur district under different agronomic practices—Irrigation (I), Seaweed (M) and Fertilizer (F)—and the average yield in quintals per hectare*

Practices followed	No. of fields	% to the total	1961-62			1962-63			1963-64			1964-65			Pooled		
			Avg. yield	No. of fields	% to the total	Avg. yield	No. of fields	% to the total	Avg. yield	No. of fields	% to the total	Avg. yield	No. of fields	% to the total	Avg. yield	No. of fields	% to the total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
Rice (Kuruvai)																	
IMF	110	49	18.0	187	66	17.7	180	63	17.0	184	64	17.9	661	61	17.6		
IMO	75	33	16.8	89	31	16.6	95	33	14.6	97	33	15.7	356	33	15.9		
IOF	30	13	19.2	1	1	1	5	2	17.6	5	2	15.8	41	4	18.6		
100	10	5	14.9	9	3	13.0	7	2	18.3	2	1	†	28	2	15.2		
Rice (Samba)																	
IMF	124	35	19.0	179	64	16.2	186	63	16.2	178	60	18.1	667	54	17.2		
IMO	179	51	17.9	91	32	14.3	99	33	12.6	93	32	17.1	462	38	15.9		
IOF	21	6	18.2	5	2	12.8	5	2	16.3	15	5	17.3	46	4	17.1		
100	30	8	18.2	5	2	13.3	6	2	14.8	9	3	16.6	50	4	17.0		
Rice (Thaladi)																	
IMF	43	26	19.1	177	68	14.0	159	57	13.9	181	64	17.2	560	57	15.4		
IMO	20	12	13.7	45	17	12.8	55	20	10.8	44	16	15.4	164	16	12.9		
IOF	78	47	19.2	30	11	14.0	51	18	13.5	45	16	14.6	204	21	16.0		
100	25	15	15.9	10	4	13.0	13	5	8.4	11	4	10.0	59	6	12.7		

\* Less than 0.5%.

† Average yield for less than 5 observations is not given.

## ANNEXURE 10.9

*Percentage distribution of fields sampled in Thanjavur district according to source of seed used and their average yield in quintals per hectare.*

Year	Source of seed	Rice (Kuruvai)			Rice (Samba)			Rice (Thaladi)		
		Number of fields	% to the total	Average yield	Number of fields	% to the total	Average yield	Number of fields	% to the total	Average yield
1	2	3	4	5	6	7	8	9	10	11
1962-63	Own source	102	41	16.6	136	47	14.7	124	47	13.1
	Co-operative Society/Govt.	41	17	20.3	31	11	17.6	40	15	16.9
	Others	105	42	17.0	123	42	15.2	101	38	13.3
1963-64	Own Source	151	53	15.9	172	58	14.5	147	53	13.0
	Co-operative Society/Govt.	19	7	15.8	18	6	17.7	12	4	13.9
	Regd. seed growers	39	13	17.8	8	3	16.7	22	8	15.5
	Others	78	27	16.4	98	33	15.2	97	35	12.3
1964-65	Own source	181	63	17.2	179	61	18.3	169	60	15.5
	Co-operative Society/Govt.	10	4	17.7	10	3	19.9	13	5	19.0
	Regd. seed growers	24	8	18.8	25	9	18.9	31	11	18.7
	Others	73	25	17.2	81	27	15.8	68	24	16.5

## CHAPTER XI

### WEST GODAVARI (ANDHRA PRADESH)

#### I

##### *Coverage*

11.1 The Package Programme was launched in West Godavari district during the rabi season of 1960-61 in 170 villages spread over 20 blocks. It was extended to 675 villages selected from 22 blocks during 1962-63. The remaining 3 blocks in the district were taken up for implementation of the programme in 1963-64; the coverage in terms of villages brought under the programme also increased to 892 that year and to 894 in 1964-65. The programme thus covered over 98 percent of the villages in the district. At present there are only 16 blocks in the district instead of 25 earlier as they have been reorganised during 1964-65.

11.2 During the first year of the programme i.e. 1960-61, 16,571 farm plans were prepared for the rabi crop covering about 8 per cent of the total number of cultivating families in the district. The number of plans prepared during 1962-63 was 1,25,982. Greater emphasis was laid on a wide coverage of area in the subsequent years; consequently the number of farm plans prepared was slightly less—1,16,948 during 1963-64 and 1,19,376 during 1964-65. About 60 per cent of the farm families in the district were participating in the programme during 1964-65. The cultivated area covered by farm plans also increased, commensurate with the increase in farm families covered. As compared to 0.25 lakh hectares or 5 per cent of the gross cropped area in the district covered under the farm plans during 1960-61, the coverage increased to 2.59 lakh hectares or 54 per cent of the total cropped area in 1962-63 and to 4.05 lakh hectares or 84 per cent of the total cropped area in 1963-64 and 1964-65.

##### *Demonstrations*

11.3 As an integral part of the Package Programme a number of composite demonstrations are laid out on cultivators' holdings to demonstrate to the farmers, the effectiveness of the package of improved practices over traditional methods. The number of such demonstrations laid out during 1964-65 was 423 in kharif and 200 in rabi as against 293 in kharif and 175 in rabi of 1963-64, and 1,491 in kharif and 939 in rabi of 1962-63. Majority of these demonstrations were on the raising of paddy crop. As the quality of demonstrations was of primary importance, their number was reduced to a manageable minimum from 1963-64. During 1964-65

it was decided to have composite demonstrations on paddy crop only, as it was the most important crop in the area. The yields obtained from the demonstration plots during the year 1963-64 and 1964-65 were 15 to 18 per cent higher as compared to those from control plots. The cost-benefit analysis of data relating to these demonstrations showed a net return of Rs. 1.87 to Rs. 2.19 for each additional rupee spent on recommended practices.

11.4 An achievement of IADP in West Godavari, which is of considerable significance to agriculture in this area, has been the successful raising of an early second crop of paddy during December-March instead of January-April. The area-wide demonstrations organised under the programme established conclusively its feasibility under effective plant protection measures and, as a result, it is now becoming increasingly popular with farmers. The normal practice of growing rabi paddy in the district was to raise nurseries in the third week of January and transplant seedlings in the second week of February. The farmers hesitated to plant the crop earlier owing to the high incidence of paddy borers during December and January. However, by planting the crop late in February it suffered from scarcity of irrigation water during flowering and post-flowering phases in April. On the other hand, sufficient water was available in the rivers during December to March, a part of which remained unutilised. In order to overcome this problem and bring additional area under paddy, attempts were made in 1962-63 and 1963-64 rabi seasons to resort to early planting by about a month. The trial-cum-demonstrations conducted were very successful and protection of the crop from borer-attack in December-January was achieved by endrin-spraying. By growing the crop early it did not suffer from lack of irrigation and by ensuring regular protection of crops by spraying and other improved practices, yield of paddy increased considerably. The average yield of early planted crop varied between 3,700 to 4,600 kg. per hectare as against the average of 3,200 to 3,700 kg. per hectare in the case of normally planted second crop. With the introduction of early planting, it also became possible to fit into the crop rotation a green manure crop like *dhaincha* before raising the kharif paddy; such a system of crop rotation would provide green manure to the succeeding kharif crop and also reduce the demand for fertilizers which was in short supply. This is a good example of the break-through brought about by application of modern technology in pest control. The area sown under early paddy crop was about 9,000 hectares in 1964-65 and it is expected to increase to about 40,500 hectares during 1965-66. It is also likely that, with this change, area under second paddy crop will be doubled within the existing water resource limit.

#### *Fertilizers*

11.5 The progress in the offtake of fertilizers in the district is

indicated in the table below :—

(in tonnes)

Year	Nitrogenous (in terms of Ammonium Sulphate)	Phosphatic (in terms of Super-phosphate)
1960-61	18,631	4,642
1961-62	34,463	16,466
1962-63	49,000	20,671
1963-64	41,199	19,055
1964-65	64,802	32,084

11.6 The off-take of nitrogenous fertilizers marked a rise of 248 per cent during 1964-65 as compared to that in the year 1960-61 while in the same period off-take of phosphatic fertilizers witnessed an increase of 591 per cent. The use of potassic fertilizers in the district too has become increasingly popular as its off-take increased from 30 tonnes in 1961-62 to 2,330 tonnes in 1964-65. The supplies of fertilizers to farmers are channelled through cooperatives. There were 282 retail depots managed by co-operative societies supplying fertilizers and other input items to the farmers in 1964-65.

#### *Improved seeds*

11.7 With expansion in coverage under the programme, there was a steady increase in the demand for improved seeds. During 1964-65, 1,471 tonnes of improved paddy seeds were distributed to the farmers as against 1,440 tonnes in 1963-64, 1,215 tonnes in 1962-63 and 976 tonnes in 1961-62. The area covered by improved seeds was 0.46 lakh hectares in 1964-65 as compared to 0.40 lakh hectares in 1963-64, 0.36 lakh hectares in 1962-63 and 0.29 lakh hectares in 1961-62. An incentive is being given to cooperatives by way of a subsidy of Rs. 2/- per bag of 0.75 quintal towards handling charges. They handled about 55 per cent of the total seed distributed.

11.8 The quality seeds programme, presently confined to paddy, was started in the district in August, 1963. It envisaged production of sufficient quantity of quality seed for distribution to cultivators for planting 1/5th of the area under paddy in each season . The main items of

work taken up so far were supervision of seed farms and various operations like planting, roguing, harvesting, threshing, processing and storage of seeds. Four M72 B clipper units were used at the research stations and the State seed farms to clean and process the seed. With the addition of 5 more units, the work would be intensified and a substantial improvement in the quality of seed procured would be achieved.

#### *Plant Protection*

11.9 Steady progress has been made under the plant protection programme. During 1964-65, cropped area of 2.14 lakh hectares was treated against pests and diseases as compared to 1.99 lakh hectares in 1963-64 and 0.95 lakh hectares in 1962-63. The quantity of seed treated during 1964-65 was 2,275 tonnes against 2,708 tonnes treated in 1963-64 and 2,759 tonnes treated in 1962-63. The quantity of pesticides distributed was 421 tonnes and 356 tonnes respectively during the 2 years 1963-64 and 1964-65. There was also an appreciable demand for equipment which was evident from the fact that the overall position of availability of plant protection equipment in the district improved considerably over the period. There were 4,674 hand-operated sprayers, 1,928 hand-operated dusters, 139 power sprayers and 142 seed-treating drums in use in 1964-65 as against 3,784 hand-operated sprayers, 1,876 hand-operated dusters, 137 power sprayers and 112 seed-treating drums in use in 1963-64.

#### *Agricultural Implements*

11.10 The construction of workshop building at Tadepalligudem has been completed and efforts are being made to equip the workshop with requisite machinery. At this workshop new implements would be designed, tested and passed on for large scale fabrication. Jeeps and tractors provided for each block will also be serviced and repaired in this workshop. It is also programmed to give training to artisans in the workshop.

11.11 A survey of all types of agricultural implements in the district was conducted with a view to determining their workability and suitability for different kinds of soils. A number of implements of improved type such as light mould-board ploughs, ridge ploughs, weeders; etc. were supplied to every block for demonstration purposes. During 1963-64 every block was also provided with a tractor with trailer and matching implements for the three-fold purposes of demonstration, transport of seeds fertilizers; etc., and for hiring out to farmers.

11.12 However, the implements workshop did not make much headway in the district. A number of posts sanctioned for the workshop remained unfilled.

*Soil Testing Laboratory*

11.13 Pending the completion of the soil testing laboratory at Tadepalligudem, analysis of soil samples collected from the district was being done at the soil testing laboratory at Bapatla. The number of soil samples collected, analysed at Bapatla and soil recommendations made are indicated in the table below:—

	1960-61	1961-62	1962-63	1963-64	1964-65
No. of soil samples collected	731	4921	8475	8680	10935
No. of samples analysed	478	3433	5447	6929	6425
No. of recommendations made	430	3116	5512	6929	3500

Thus out of the 0.34 lakh soil samples collected from cultivators' holdings in different blocks, 0.23 lakh samples were analysed and about 0.20 lakh recommendations were made during the quinquennium 1960-61 to 1964-65. Based on soil testing summaries, block-wise fertility index maps with respect to  $P_2O_5$  and organic carbon had been prepared. Efforts are now being made to formulate block-wise recommendations based on the available soil test data. The package of recommendations are also being modified on the basis of soil tests and a new set of package of practices, with special reference to use of fertilizers, has already been approved for implementation from 1965-66 kharif season.

11.14 Work on the new Soil Testing Laboratory at Tadepalligudem had been completed only recently and the laboratory was inaugurated in July 1965.

*Cooperative Credit and Marketing*

11.15 The role, the cooperatives have to play in the programme has been well recognised and every effort has been made to promote and strengthen the cooperatives in the district. The credit societies now cover 98 per cent of the villages and 60 per cent of the agricultural population in the district as against 97 per cent villages and 51 per cent of agricultural population in 1962-63 and 96 per cent of villages and 51 per cent of agricultural population in 1961-62.

11.16 Several steps have been taken in recent years to make the cooperatives efficient and prompt in credit disbursement and more helpful to the farmers. In order to enable the farmers to properly utilise the loans and also to repay it promptly from the annual sale proceeds of crops, the principle of seasonality in loaning has been introduced. Short-term loans

for kharif crop (paddy) are issued during May to August with the following 31st March fixed as due date of repayment. Similarly loans for the rabi crop are issued during November-February and the ensuing 15th of August is fixed as the due date for repayment.

11.17 As farmers are expected to require greater amount of loan, under the package programme, because of improved practices proposed, credit limits of the societies and individuals have been relaxed by suitably amending the bye-laws. Thus, in the case of primary credit societies, the individual maximum credit limit of Rs. 1,000/- under medium term loans is also permitted to be utilised under short term, thus raising the short term limit from Rs. 1000 to Rs. 2000. Similarly the individual maximum credit limit under short term in the case of large scale cooperative societies (LSCS) and rural banks is permitted to be raised from Rs. 2,000/- to Rs. 4,000/- allowing the utilisation of the limit of Rs. 2,000/- under medium term as short term whenever found necessary. The maximum amount of loans advanced against surety is also raised from Rs. 500/- to Rs. 750/-. The maximum borrowing limits of societies are permitted to be raised, merging their limits under medium term in the short term limits.

11.18 Another facility given under the scheme is the provision of Special Bad Debt Reserve. To encourage the issue of loans to landless tenants, marginal and sub-marginal cultivators and weaker sections of the community, the Government of India have come forward with a scheme of sanctioning outright grants to cooperative societies and cooperative central banks at 4 per cent and 2 per cent over the excess amounts disbursed by them in any particular year over the preceding year and these grants are to be pooled by them into a Special Bad Debt Reserve to be used to offset any loss they incur by such liberal financing of weaker sections of the community.

11.19 The progress recorded by cooperative credit societies in important spheres of their activity is indicated in the following table:—

Year	No. of Societies	Member-ship (Lakhs)	Share Capital (Rs. in lakhs)	Deposits (Rs. in lakhs)	Loans advanced (Rs. in lakhs)
1960-61	394	1.67	55.62	27.18	313.47
1961-62	415	1.69	61.25	26.33	332.02
1962-63	415	1.71	65.96	21.85	325.67
1963-64	427	1.78	66.54	26.49	240.50
1964-65	427	1.75	67.48	25.89	190.53

Between the years 1960-61 and 1964-65, there has been a steady expansion of the cooperative sector in the district. The number of cooperatives functioning increased from 394 to 427, their membership from 1.67 lakhs to 1.75 lakhs and their share capital from Rs. 55.62 lakhs to Rs. 67.48 lakhs. However, the deposits with these societies either remained stagnant or declined during this period and loans advanced by them shrunk after some expansion during 1961-62 to 1962-63. Steps have already been taken to attract more deposits. The rates of interest offered by the cooperative societies on the various kinds of deposits were raised recently and this is expected to produce encouraging response. The decline in the quantum of loans advanced during 1964-65, it is reported, was mainly due to procedural delays on the part of central bank and State Government which resulted in the late sanctioning of credit limits, by the Reserve Bank of India. Steps have already been initiated to ward off the recurrence of such lapses in future.

11.20 The number of cooperative marketing societies servicing the district increased from 10 in 1959-60 to 11 in 1964-65. Upto 1961-62 these societies did not undertake any marketing of agricultural produce. During 1962-63 they marketed agricultural produce worth Rs. 0.70 lakh. The produce marketed during 1963-64 was worth Rs. 0.20 lakh but it recorded an appreciable increase to Rs. 2.01 lakhs during 1964-65. However, a proper link between the credit and marketing of crop is yet to emerge.

#### *Godowns*

11.21 It is estimated that 250 godowns would be required to saturate the district. At the end of June 1964 there were 97 godowns existing and 36 were under construction. During the year 1964-65, 15 more godowns were completed raising the total strength to 112 and work on 57 godowns was progressing.

## II

### *Results of Agronomic and Agro-economic Survey, 1961-64*

11.22 The survey was initiated during the year 1961-62 in the district and five control blocks namely Rajanagaram, Samalkot, Tellerevu, Kothapeta and Nagaram in East Godavari district and since then it is being repeated annually. In the first year about 580 holdings in the district and 230 holdings in the control blocks at the rate of 8 holdings per village were randomly selected for enquiry. In the subsequent years, the number of holdings selected in the district and the control blocks respectively were 600 and 350.

#### *Holding Size*

11.23 It was observed from the survey that about 50 per cent of the cultivators in the district cultivated land less than one hectare (very small),

while 15 per cent of the cultivators cultivated land more than 4 hectares (large). Cultivators who cultivated land of area 1-2 hectares (small) and 2-4 hectares (medium) constituted 21 per cent and 14 per cent respectively.

11.24 Large size holdings accounted for 50 per cent of the total cultivated area in the district. On the other hand, the share of the cultivated area of very small holdings was of the order of only 12 per cent. The small and medium size holdings accounted for 16 per cent and 22 per cent respectively.

11.25 The proportion of cultivators' holdings and that of the cultivated area in the various size groups of holdings were of the same order in the control blocks as in the IADP district.

11.26 About 86 per cent of the cultivators sampled in the district depended entirely on their own land for cultivation. Cultivators depending solely on leased in land constituted only 3 per cent. The rest were cultivating some land taken on lease in addition to their own land. Cultivators who had taken land on lease belonged mostly to the first three categories of holding sizes. Cultivated land taken on lease in the district was estimated to be of the order of about 10 per cent.

#### *Cropping Pattern*

11.27 During the period of three years, there was an increasing trend in area under cash crops like sugarcane, chillies, groundnut, vegetables and fruits. The increase was noted in all the holding size groups. The results, averaged over the three years of the survey, indicated a decrease in the proportion of gross cropped area under foodgrains with increase in the holding size, being 80 per cent in very small size holdings and 68 per cent in large size holdings (Annexure 11.1) The percentage of gross cropped area under second crop paddy decreased with increase in holding size, while in the case of pulses a positive association was observed.

#### *Distribution of production supplies*

11.28 Improved seeds of paddy, green manure seeds, nitrogenous and phosphatic fertilizers and plant protection chemicals were the chief items of production supplies distributed to the cultivators. Improved seed was availed of by 4 per cent of the cultivators in 1961-62 and this percentage increased to 10 in 1963-64. The proportion of cultivators availing of supplies of nitrogenous fertilizers during the kharif season rose from 20 per cent in 1961-62 to 63 per cent in 1963-64. Most of the cultivators who raised paddy crop during the rabi season of the year 1963-64 availed of this supply. The progress in respect of supplies of plant protection chemicals was also

satisfactory. The proportion of cultivators receiving this supply rose from 25 per cent in 1962-63 to 50 per cent in 1963-64.

11.29 A comparison of the percentage of recipient cultivators of different holding sizes in respect of various items of supply indicated a positive association with holding size. Nitrogenous fertilizers were taken during kharif 1963-64 by 41 per cent of the cultivators having very small holding, while the corresponding figure for large size holding was 78 per cent. Distribution of improved seeds of paddy also increased with holding size. Improved seed of paddy was received by 1 per cent of the cultivators of very small holdings, both in kharif and rabi seasons of the year 1963-64, while the corresponding proportions for large holding size were 18 per cent during kharif and 10 per cent during rabi in the same year.

#### *Distribution of credit*

11.30 Information on credit is being collected since the year 1962-63. The data collected during the years 1962-63 and 1963-64 indicated that facility for agricultural credit provided by the Government or cooperative societies was availed of by 33 per cent of the cultivators in 1962-63 and by about 44 per cent in 1963-64. The rest of the cultivators availed of agricultural credit mostly from traders. In respect of loans for non-agricultural purposes, traders were the main source.

11.31 The total amount of loans obtained from all sources by a cultivator in the district was of the order of Rs. 278 in the year 1962-63 (Annexure 11.2). This rose to Rs. 316 during 1963-64. Increase in the amount of loan taken was due mainly to borrowings of higher order for agricultural purposes from non-institutional sources. Agricultural loans accounted for about 86 per cent of the total amount of loans during the first year and about 87 percent in the second year. About one half of the loan taken in either of the two years for agricultural purposes was obtained from cooperative societies or Government. The rest was secured from non-institutional sources such as traders and money-lenders.

11.32 A study of the loans taken by cultivators of various size groups indicated that the amount of loan taken by them increased with the size of holding in both the years. Average loan taken during 1963-64 by a cultivator having very small holding was Rs. 56. Corresponding amounts for small, medium and large size cultivators were Rs. 82, Rs. 214 and Rs. 587 respectively. The amount of loan per hectare showed a negative association with the holding size, being Rs. 94 for very small size holding and Rs. 60 per hectare for large size holding.

#### *Use of manures and fertilizer*

11.33 There was a substantial increase in the fertilizer use in the district during the three years covered. In the year 1961-62, chemical

fertilizers were used in the district by 42 per cent of cultivators, while in the year 1963-64 it was used by 67 per cent of the cultivators. In the control areas also an increase of similar order in the fertilizer use was observed.

11.34 Farm-yard manure was the chief organic manure used in the district. It was applied generally in the kharif season. The practice of using chemical fertilizers in conjunction with organic manure was relatively more popular in that season. During kharif season of 1963-64, almost all cultivators applied chemical fertilizers in combination with farm-yard manure. About two thirds of the fertilizer users in the rabi season did not apply farmyard manure as basal dressing to the crops.

#### *Crop-wise consumption of fertilizers and manures*

11.35 The quantity of nitrogenous fertilizers distributed in the district during the year 1961-62 was of the order of 34, 500 tonnes. It increased to 49,000 tonnes in 1962-63 and then declined to 41,200 tonnes in 1963-64. Out of the total quantity distributed in 1962-63, about 70 per cent was applied to paddy crops (43 per cent to first paddy crop and 27 per cent to second paddy crop). Cash crops, mainly sugar-cane, tobacco and chillies grown in the district consumed about 24 per cent of this fertilizer and garden and vegetable crops accounted for about 4 per cent. The consumption pattern of these fertilizers during 1963-64 remained more or less of the same order as during 1962-63, except that the proportion used for sugarcane increased to 17 per cent.

11.36 The quantity of phosphatic fertilizers distributed in 1962-63 was about 20,700 tonnes. It declined to 19,000 tonnes during 1963-64. Phosphatic fertilizers were used mainly on paddy crops; it was of the order of 87 per cent of the total consumption during the year 1963-64. Commercial crops like sugar-cane, tobacco and chillies consumed about 9 per cent of this fertilizer. The remaining quantity was used mostly on vegetables and garden crops.

11.37 Mixed fertilizers were mainly applied to paddy, sugar-cane and tobacco. Nearly 43 per cent of this fertilizer was applied to paddy.

11.38 The total quantity of farm yard manure applied to the various crops grown in the district during the year 1963-64 was estimated 36.2 lakh tonnes. Of this, over 90 per cent was applied to paddy and the remaining to cash crops.

#### *Percentage area and average rate of application*

11.39 There was satisfactory progress in the application of fertilizers. A rise in the percentage area fertilized was noticed in respect of both the first and second crops of paddy (Annexure 11.4). The area under first crop of paddy benefited by nitrogenous fertilizers rose from 28 per cent during 1961-62 to 55 per cent in the year 1963-64 and in the case of second paddy

crop it rose from 66 per cent in 1961-62 to 83 per cent in the subsequent two years viz., 1962-63 and 1963-64. There was a considerable increase in the percentage area benefited by this fertilizer under important cash crops like banana, chillies, sugar-cane and tobacco. During 1963-64, the proportion of area under these crops benefited by introgenous fertilizers was of the order of 47 per cent, 59 per cent, 94 per cent and 76 per cent respectively.

11.40 The average rate of application of nitrogenous fertilizer (applied to the benefited area) to first crop of paddy, which was already high—104 kg. per hectare even in the initial year of the programme viz., 1961-62 (about 93 per cent of the recommended rate)—further increased to 112 kg. per hectare during 1963-64. In the case of the second crop of paddy there was a slight decrease in the rate of application in the year 1963-64 from that of 1961-62.

11.41 About 8 per cent of the area under first paddy crop was benefited by phosphatic fertilizer in the first year of the programme, which rose to 15 per cent during the year 1963-64. In respect of second paddy crop, there was a steady increase in the area benefited by application of this fertilizer, from 11 per cent in 1961-62 to 52 per cent in the year 1963-64. Area benefited by this fertilizer during 1963-64 was 27 and 22 per cent respectively for sugar-cane and tobacco crops, 4 per cent for banana and 3 per cent for chillies crops. The average rate of application of phosphatic fertilizer showed an increasing trend in the case of first paddy crop, the rate increasing from 156 kg. per hectare in the year 1961-62 to 178 kg. per hectare during 1963-64. For the second paddy crop, the average rate of application for the three years was about 156 kg. per hectare.

11.42 The use of mixed fertilizer was relatively more common to first and second paddy crops. Percentage area of first and second crops of paddy benefited by this fertilizer was of the same order during 1963-64. Average rate of application was of the order of 72 kg. per hectare in case of the first crop and 151 kg. per hectare in case of the second crop in that year.

11.43 Use of green manuring was becoming popular for both the paddy crops. Area benefited by this manure during the year 1962-63 was of the order of 14 per cent for each of the two paddy crops. During the year 1963-64, the proportion of area benefited further increased to 25 per cent and 16 per cent respectively for the first and second crops of paddy.

11.44 The use of fertilizer in the district had become increasingly popular during the years of operation of the scheme, as could be seen from the table given below:—

*Consumption of nitrogenous fertilizer by different crops expressed as percentage of the quantity required for saturation of the entire area under crop with fertilizer at recommended rates.*

Crop	1961-62	1962-63	1963-64	1964-65*
Paddy (first crop)	26	50	57	60
Paddy (second crop)	46	52	54	82

\*Provisional.

#### *Holding size and use of fertilizers and manures*

11.45 It was observed that percentage area benefited by nitrogenous fertilizer under first paddy crop generally increased with holding size. During the year 1963-64, it rose from 42 per cent in small holding class to 58 per cent in large holding class. In respect of second crop paddy, 85 to 90 per cent of cultivators in all holding size classes used nitrogenous fertilizer. Percentage area benefited by phosphatic fertilizer under first paddy crop increased with the size of holding. During 1963-64, it was 3 per cent in very small holdings and 17 per cent in large holdings. Percentage area benefited by phosphatic fertilizer under second crop paddy was of a higher order for medium and large size holdings compared to very small and small size holdings. It was 32 per cent in very small, 23 per cent in small, 45 per cent in medium and 58 per cent in large size holdings.

### III

#### *Results of crop cutting surveys conducted during 1961-65*

11.46 Crop cutting surveys were planned on first and second crops of paddy which together accounted for 70 per cent of the gross cropped area in the district. From the year 1961-62 onwards, about 300 crop cutting experiments in the district and 50 to 75 experiments in the control area were planned on each of the two paddy crops. The estimates of average yield of rice are presented in Annexure 11.5. It may be seen from the Annexure that there were wide fluctuations in the yield rates of these crops, largely due to natural hazards like floods during the kharif season and inadequate water supply during the rabi season.

11.47 Inspite of adverse seasonal effects, the average yield rates as well as the total production of both the rice crops had considerably increased during the period 1961-65 compared to the corresponding figures for the year 1958-61 (Annexures 11.5 and 11.6). This increase was more perceptible in the case of second paddy crop for the IADP district, whereas for the

same crop there was little increase during the period in the adjoining districts as well as in the State as a whole (excluding the IADP district). However, no consistent trend was observed during the period of operation of the scheme in yield rates. Even when these yield rates were adjusted for seasonal effects and normal development activities with the help of the data from comparable areas, no trend was noticed.

#### *Participants versus non-participants*

11.48 Results presented in Annexure 11.7 indicated that proportion of fields of participant cultivators increased steadily from year to year in respect of first crop of paddy. The proportion of fields of participant cultivators rose from 30 per cent in 1961-62 to 73 per cent in 1964-65. In respect of second crop of paddy, this proportion rose from 63 per cent in 1961-62 to almost 92 per cent in 1964-65.

11.49 A comparison of the yield rates obtained by participants and non-participants in various years indicated that the yield rate of first paddy crop obtained by participant cultivators was higher by about three quintals per hectare than those of non-participant cultivators in all the years except 1962-63. In that year, the increase in the yield rate was less due to heavy damage by floods. As all the cultivators growing second crop paddy participated in the programme during 1963-64 onwards, this comparison was not possible.

#### *Combination of agronomic practices with the yield rate*

11.50 The results pertaining to the combination of fertilizers and manuring practices with irrigation for the two paddy crops are presented in Annexure 11.8. It may be seen that there was a substantial increase in the yield rate per hectare due to use of fertilizers. The additional yield per hectare, averaged over the four years in fields benefited by fertilizer application over the fields not receiving fertilizers, was about two quintals of rice in respect of first crop of paddy and about four quintals of rice in respect of second crop of paddy.

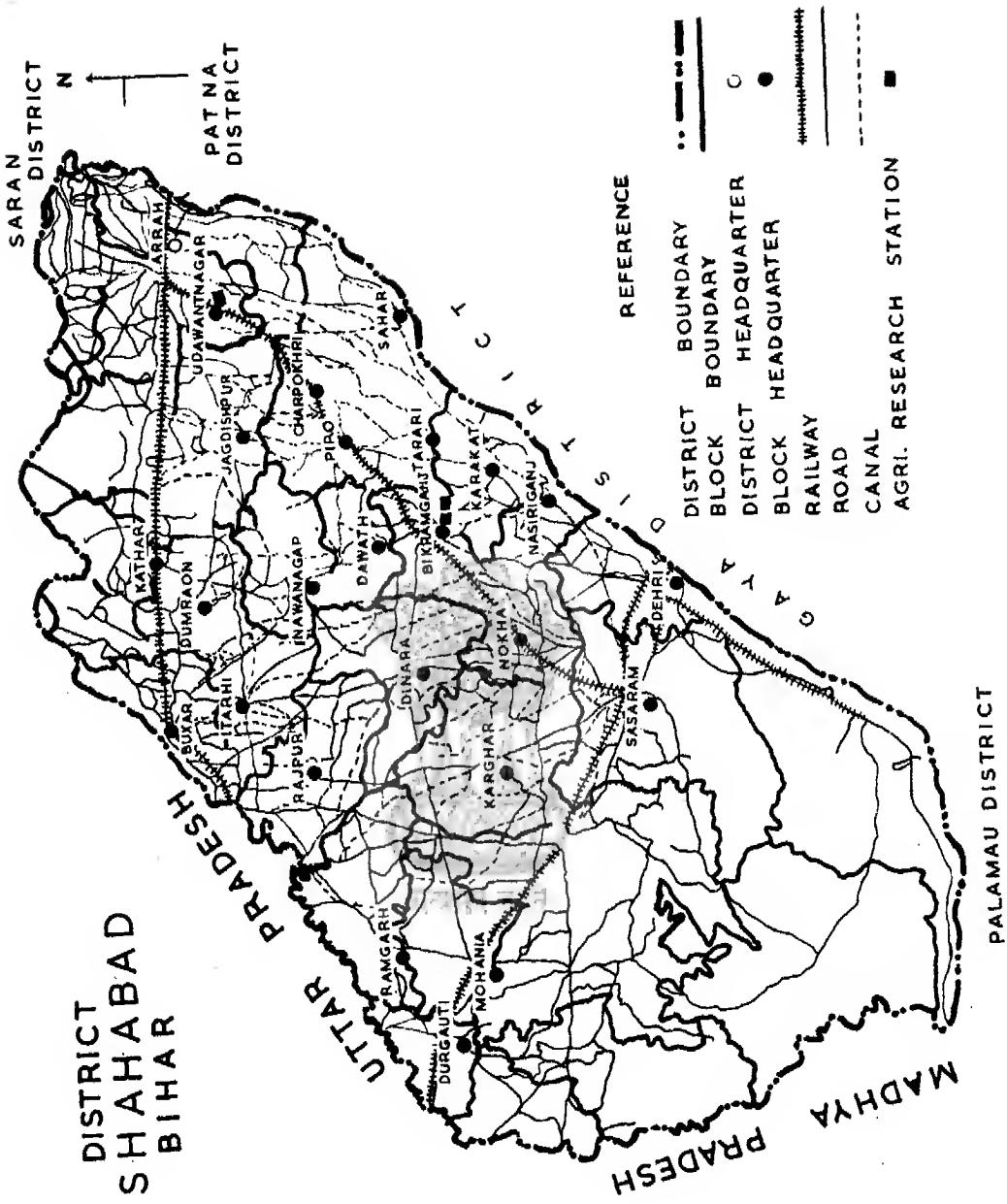
11.51 As regards seeds, on an average about 60 per cent of the fields under first crop paddy and an equal percentage of the fields under second crop paddy were sown with improved seeds. S.L.O. 13 was the most common improved seed used for the first crop, while S.L.O. 16 and S.L.O. 19 and M.T.U. 15 were the strains used for the second paddy crop. The performance of improved seeds was consistently superior to local seeds.

11.52 A comparison of the yield rates of the fields sown with seeds obtained from different sources indicated generally higher yield rates in respect of second crop of rice in fields sown with seeds obtained from co-operatives or Government. (Annexure 11.9).

## ANNEXURE 11.1

*Percentage area under different crops for different holding size groups in West Godavari district averaged over the three years 1961-62 to 1963-64*

Name of Crop	Percentage area under various crops				
	Very small holdings	Small holdings	Medium holdings	Large holdings	Pooled overall holdings
1	2	3	4	5	6
Paddy—1st Crop	59	53	57	46	50
Paddy—2nd Crop	17	15	13	13	13
Pulses	2	4	4	6	5
Millets	2	4	2	3	3
Total foodgrains	80	76	76	68	71
Sugarcane	2	3	3	2	2
Tobacco	1	2	2	3	2
Chillies	3	1	2	3	3
Garden crops	3	7	4	10	9
Green manure crops	6	6	7	6	6
Other crops	5	5	6	8	7
Total all crops	100	100	100	100	100



ANNEXURE 11.2  
*Average amount of loan borrowed per sampled cultivator from different agencies during the years 1962-63 and 1963-64*

Agency	Amount (in Rs.) borrowed per sampled cultivator									
	1962-63			1963-64			Very small holdings	Medium holdings	Large holdings	Pooled
	1	2	3	4	5	6				
1. Government or Cooperative	55.42	45.86	93.31	213.89	123.85	26.74	42.29	70.39	232.04	124.46
2. Others										
(i) For agricultural purposes	3.41	55.19	106.22	213.08	116.31	14.83	32.45	116.60	282.03	151.29
(ii) For non-agricultural purposes	0.00	11.38	23.46	79.43	38.14	14.53	7.14	27.17	73.03	40.23
(iii) Total	3.41	66.57	129.68	292.51	154.45	29.36	39.59	143.77	355.06	191.52
3. Pooled over all agencies										
(i) Per cultivator	58.83	112.43	222.99	506.40	278.30	56.10	81.88	214.16	587.10	315.98
(ii) Per hectare of cultivated area	117.66	74.46	76.63	49.94	55.44	93.50	56.47	75.14	59.73	62.69
Number of sampled cultivators	177	145	162	315	799	172	175	205	393	945

**ANNEXURE 11.3**  
*Percentage cropwise consumption of different organic manures and chemical fertilizers in West Godavari district during the years 1961-62 to 1963-64*

Crop	F.Y.M. or Compost			Nitrogenous fertilizer			Phosphatic fertilizer		
	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64
1	2	3	4	5	6	7	8	9	10
Paddy 1st Crop	74	83	33	41	43	42	63	54	44
Paddy 2nd Crop	9	5	8	42	27	27	27	38	43
Pulses	6	2	*	—	1	—	3	—	—
Sugarcane	1	2	2	8	14	17	1	2	6
Tobacco	4	3	2	4	8	7	4	4	3
Chillies	2	1	1	2	2	2	2	*	*
Vegetable & Garden Crops	*	1	1	2	4	4	—	1	3
Others	4	3	3	1	1	1	—	1	1

\* Percentage less than 0.5  
 F. Y. M. = Farm yard manure.

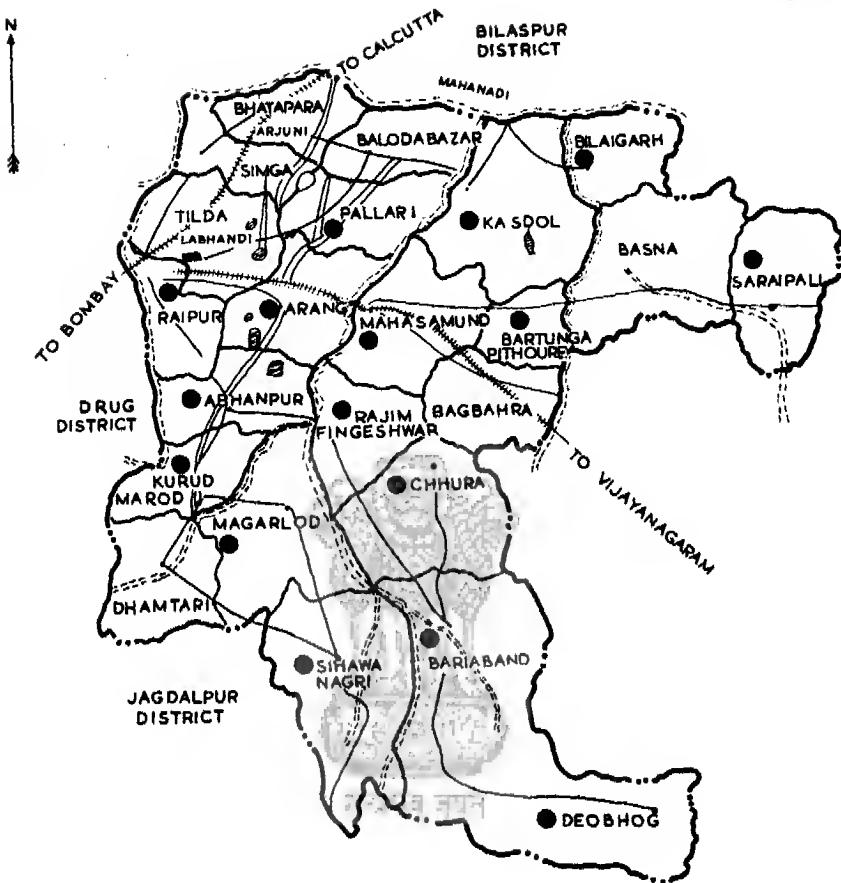
## ANNEXURE 11.4

*Percentage area under the various crops in West Godavari district benefited by different manures and fertilizers and their average rates of application*

Type of area	Kind of organic manure or chemical fertilizer	Rice (First crop)						Rice (Second crop)					
		Percentage area benefited		Average rate of application (Q/H)		Percentage area benefited		Average rate of application (Q/H)		Percentage area benefited		Average rate of application (Q/H)	
		1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64
IADP district	F.Y.M. or compost	62	82	84	173	122	143	36	27	21	118	78	150
	Nitrogenous fertilizers (in terms of Ammonium Sulphate)	28	47	55	1.04	1.11	1.42	66	82	83	1.57	1.29	1.43
	Phosphatic fertilizers (in terms of Single Super-phosphate)	8	14	15	1.56	1.66	1.78	11	37	52	1.65	1.48	1.53
	Fertilizer mixture	—	3	6	—	0.65	0.72	1	16	7	—	1.29	1.51
Control area	F.Y.M. or compost	86	76	76	155	116	94	94	45	21	147	141	129
	Nitrogenous fertilizers (in terms of Ammonium Sulphate)	44	52	71	0.93	0.92	0.79	92	82	90	1.89	1.29	1.21
	Phosphatic fertilizers (in terms of Single Superphosphate)	7	7	15	1.92	1.76	1.62	38	39	53	2.22	1.66	1.61
	Fertilizer mixture	—	6	4	—	1.38	0.37	—	3	11	—	1.42	0.68

F.Y. M. = Farm yard manure.  
Q/H = Quintals per hectare.

DISTRICT  
RAIPUR  
MADHYA PRADESH



REFERENCE

DISTRICT BOUNDARY		ROAD	
BLOCK BOUNDARY		RIVER	
DISTRICT HEADQUARTER		CANAL	
BLOCK HEADQUARTER		DAM AND TANK	
RAILWAY		AGRI-RESEARCH STATION	

**ANNEXURE 11.5**  
*Average yield in quintals per hectare in West Godavari district and comparable areas.*

Crop	Year	West Godavari district		Adjoining* districts		Andhra Pradesh excluding West Godavari		Adjusted yield utilising results relating to		
		Av. yield	S.E.	Av. yield	S.E.	Control area	Adjoining districts	Andhra Pradesh excluding West Godavari	11	
1	2	3	4	5	6	7	8	9	10	
Rice (First crop)	Average for 3 yrs. 1958-61	13.6	—	14.1	0.17	13.8	12.0	15.7	17.3	
1961-62	16.9	0.24	17.9	0.17	14.5	0.65	13.7	11.3	14.1	14.6
1962-63	13.8	0.33	14.5	0.36	13.1	0.65	13.7	12.3	15.0	15.3
1963-64	16.2	0.36	14.8	0.68	16.1	0.68	13.9	16.4	16.0	
1964-65	16.2	0.33	14.8	0.68	16.1	0.68	13.9	16.4	16.0	
Average for 4 yrs. 1961-65	15.8	—	14.9	—	14.3	—	12.4	—	—	No adjustment was possible since the regression coefficient was negative.
Rice (Second crop)	Average for 3 yrs. 1958-61	13.6	—	14.9	0.74	15.2	12.1	15.7	15.0	
1961-62	15.2	0.31	13.6	0.74	14.7	0.70	10.5	17.7	18.0	
1962-63	18.2	0.18	15.9	0.70	16.1	0.10	17.1	12.3	16.2	16.6
1963-64	16.8	0.32	13.6	0.72	15.9	0.72	13.5	16.6	16.6	
1964-65	16.0	0.29	13.6	0.72	15.9	0.72	13.5	16.6	16.6	
Average for 4 yrs. 1961-65	16.5	—	14.7	—	15.7	—	12.1	—	—	* East Godavari, Krishna, Khammam.

## ANNEXURE 11.6

*Total production of rice in West Godavari district.*

Year	Estimated production of crops (in 00' tonnes)		Total production (in 00' tonnes)
	Rice 1st crop	Rice 2nd crop	
1	2	3	4
Average	1958-61	3713	1237
	1961-62	4924	1280
	1962-63	3770	1657
	1963-64*	4628	1599
	1964-65*	4431	1714
Average	1961-65	4438	1562
Percentage increase or decrease of the average of years 1961-65 over average for the years 1958-61		19.5	26.3
Percentage increase or decrease in the average State production of years 1961-65 over the average for the years 1958-61		14.7	1.8
			11.6

\* Provisional.

## ANNEXURE 11.7

*Yield rates of different crops in West Godavari district separately for participant and non-participant cultivators (Quintal/Hectare).*

Crop	Year	Percentage of participant cultivators	Average yield	
			Participants	Non- participants
1	2	3	4	5
<b>Rice</b> (First Crop)				
	1961-62	30	19.8	16.8
	1962-63	46	15.4	13.6
	1963-64	72	17.7	14.8
	1964-65	73	17.0	14.2
<b>Rice</b> (Second Crop)				
	1961-62	63	15.1	14.4
	1962-63	73	19.0	18.3
	1963-64	96	17.9	*
	1964-65	92	15.9	*

\*Indicates that the average yield has not been given since the observations are too few.

ANNEXURE 11.8

*Percentage distribution of fields sampled in West Godavari district for different combinations of practices—Irrigation (I), Manure (M), and Fertilizer (F) and their average yield in quintals per hectare.*

## ANNEXURE 11.9

*Percentage distribution of the fields sampled in West Godavari district according to the source of seed used and average yield in quintals per hectare for each source.*

Name of crop	Source of Seed	Year	1962-63			1963-64			1964-65		
			No. of fields	% to the total	Average yield	No. of fields	% to the total	Average yield	No. of fields	% to the total	Average yield
1	2	3	4	5	6	7	8	9	10	11	
Rice (First crop)	Own Source	182	65	13.6	128	45	16.4	162	54	16.6	
	Govt./Cooperative Society	50	18	17.1	55	19	19.0	45	15	16.4	
	Regd. Seed Grower	4	1	*	27	9	20.5	9	3	3	19.9
	Others	45	16	13.9	76	27	15.4	83	28	28	14.9
Rice (Second crop)	Own Source	129	46	17.5	122	42	16.6	117	39	14.9	
	Govt./Cooperative Society	46	17	21.3	51	18	20.4	52	17	17	18.4
	Regd. Seed Grower	4	1	*	1	†	*	22	7	7	15.5
	Others	100	36	19.8	118	40	17.2	108	37	37	15.3

\* Average yield not calculated as the number of observations is less than 5.  
 † Percentage less than 0.5.

## CHAPTER XII

### SHAHABAD (BIHAR)

#### I

##### *Coverage*

12.1 The Package Programme was launched in 174 villages spread over 6 blocks in the rabi season of 1960-61. The remaining 14 blocks were taken up during 1961-62 and the coverage in terms of villages increased to 1276 in 1961-62, 2664 in 1963-64 and 2686 in 1964-65. The package programme envisages preparation of a comprehensive farm plan for every participating farmer. The number of such farm plans prepared during 1964-65 was 93,735 as compared to 78,719 in the preceding year and 2033 in 1960-61, the first year of the programme. Judging from the number of farm plans prepared, the number of cultivating families covered by the programme during 1960-61, 1963-64 and 1964-65 worked out to 1 per cent, 48 per cent and 57 per cent respectively of the total number of cultivating families in the selected blocks. With increase in number of farm families brought within the fold of the programme, the coverage in terms of cropped area also increased from 0.01 lakh hectares in 1960-61 to 1.37 lakh hectares in 1963-64 and 1.79 lakh hectares in 1964-65. The cropped area covered in 1964-65 came to 26 per cent of the cultivated area in the selected blocks, as against 20 per cent during the preceding year. It was hardly 1 per cent in 1960-61.

##### *Demonstrations*

12.2 Stress is being laid on field demonstrations of a composite type involving all the recommended practices. Paddy being the predominant crop in the area, there had been a greater number of paddy demonstrations every year from the inception of the programme. Such demonstrations were 1455 in 1961-62, 2723 in 1962-63, 2365 in 1963-64 and 1587 in 1964-65. Demonstrations on wheat growing, however, were few in earlier years. There were 93 such demonstrations laid out during 1963-64. Their number increased to 1146 during the following year. Besides, improved methods of cultivating other crops were also demonstrated by setting up suitable experiments. The overall yields of paddy obtained on demonstration plots during the period 1961-62 to 1964-65 was considerably higher by 60 to 80 per cent as compared to yields obtained from control plots. Such increases obtained in respect of wheat during the same period were more spectacular, the range of increase varying from 125 to 145 per cent. The cost-benefit analysis of data relating to paddy demonstrations showed a net return of

Rs. 2.4 and Rs. 1.7 respectively during the years 1963-64 and 1964-65, for every additional rupee expended on the recommended package of practices.

#### *Fertilizers*

12.3 There has been a significant increase in the offtake of fertilizers, both nitrogenous and phosphatic, in the programme area as is evident from the following table:—

Year	Nitrogenous (in terms of ammonium sulphate) (tonnes)	Phosphatic (in terms of super phosphate) (tonnes)
1959-60	6,156	478
1960-61	8,160	917
1961-62	11,173	3,555
1962-63	15,685	5,187
1963-64	10,881	6,010
1964-65	16,420	6,472

The off-take of nitrogenous fertilizers increased by about 167 percent in 1964-65 as compared to the pre-package year and that of phosphatic fertilizers increased several-fold during the same period. Fertilizers are distributed by about 700 cooperatives which operate as sales agents of the Bihar State Cooperative Marketing Union.

#### *Improved seeds*

12.4 There has been a marked increase in the distribution of improved seeds in the district since the inception of the programme. The quantity of improved seeds distributed has increased from 67 tonnes in 1960-61 to 651 tonnes in 1961-62, 1502 tonnes in 1962-63, 3276 tonnes in 1963-64 and 3883 tonnes in 1964-65. The entire area brought under farm plans was covered by improved seeds during 1964-65 as against 0.80 lakh hectares during 1963-64, 0.32 lakh hectares in 1962-63 and 0.12 lakh hectares in 1961-62. Some varieties of improved seeds, e.g., B.R.-34, an early *Aman* variety of paddy, N-136 another early non-sensitive type of paddy with high yield and NP-798 and NP-794 varieties of wheat have become fairly popular in the district. Apart from the improved seeds

distributed, a large number of farmers used their own improved seeds, multiplied from seeds distributed in the previous years.

#### *Plant Protection*

12.5 The area covered under plant protection measures in the district has recorded a substantial increase since 1961-62. Total cropped area treated against pests and diseases in 1964-65 was about 0.46 lakh hectares as against 0.24 lakh hectares treated in 1963-64 and 0.15 lakh hectares in 1961-62. The seeds treated during 1964-65 were only 854 tonnes, compared to 3109 tonnes in 1963-64 and 2560 tonnes in 1961-62. The pesticide formulations used during 1964-65 were 166 tonnes as against 88 tonnes in 1963-64 and 115 tonnes in 1961-62. Sales centres have been opened in each IADP block to make pesticides available within easy reach of the farmers.

12.6 The use of soil insecticides like Aldrine and Dialdrine has become popular in the district. In the case of paddy and vegetables, insecticides like B.H.C. and D.D.T. are generally liked while in potato blights, Diathene 378 and copper fungicides have gained wide acceptance.

#### *Agricultural implements*

12.7 An implement workshop at Shahabad was completed in September, 1962. The workshop undertakes repair of locally used implements and of vehicles used for IADP, manufacture of prototypes, demonstration of improved implements and training of village black-smiths in the manufacture and repair of improved implements. A seed-cum-fertilizer placement drill was developed at the workshop and some modifications were effected after field trials. As these implements proved effective, a number of prototypes were manufactured for further extensive trials in the district. A simple type of hand-rake manufactured at the workshop for inter-culture of paddy became popular and a large number of its prototypes were fabricated to meet local demand. The farmers have shown good response to an improved mould-board plough made at the workshop, also known as *Sabash* plough. The number of *Sabash* ploughs sold increased from 1659 in 1962-63 to 3050 in 1963-64 and 4214 in 1964-65.

#### *Soil testing*

12.8 Pending the completion of the soil testing laboratory at Arrah, analysis of soil samples collected from the district is presently being done at the laboratory in Patna. The progress of work in respect of soil analysis is indicated in the following table:—

	1961-62	1962-63	1963-64	1964-65
No. of samples collected	1,859	4,899	3,032	2,273
No. of samples analysed	614	1,777	3,492	2,273
No. of recommendations made	614	1,777	3,492	2,273

12.9 Considerable progress has also been made in setting up a new soil testing laboratory at Arrah. The building for the laboratory has been completed. Efforts are now being made to equip the laboratory with necessary accessories.

#### *Cooperative Credit & Marketing*

12.10 Cooperatives have made commendable progress in the district since the introduction of the programme. The coverage of agricultural families by credit cooperatives in the district has risen from 23 per cent in 1960-61 to 36 per cent in 1962-63, 38 per cent in 1963-64 and 41 per cent in 1964-65. The number of villages covered by cooperatives has also increased from 53 per cent of the total number of villages in the district in 1960-61 to 81 per cent in 1961-62 and to 97 per cent in 1964-65. An increasing number of farmers participating in the programme, but who were not members of cooperatives at the time of the introduction of the programme, have enrolled themselves as members subsequently and their contribution to share capital has also been rising.

12.11 The progress in the sphere of cooperatives in the district is indicated in the table below:

Year	No. of credit societies	Membership (lakhs)	Share capital (Rs. in lakhs)	Deposits (Rs. in lakhs)	Loans advanced (Rs. in lakhs)
1	2	3	4	5	6
1959-60 (pre-package)	1,138	0.30	4.06	0.53	12.21
1960-61	1,252	0.44	5.25	—	—
1961-62	1,643	0.62	8.43	0.74	32.52
1962-63	1,732	0.70	11.92	1.18	57.88
1963-64	1,722	0.73	14.89	1.47	49.06
1964-65	1,724	0.78	16.34	1.47	68.80

It will be seen that between 1959-60 and 1964-65 the number of societies increased from 1138 to 1724 or by 51 per cent; their membership from 0.30 lakh to 0.78 lakh or by 160 per cent; share capital of these societies from Rs. 4.06 lakhs to Rs. 16.34 lakhs or by 302 per cent and total loans advanced by them from Rs. 12.21 lakhs to Rs. 68.80 lakhs or by 463 per cent. Percentage of overdues to demand was reduced from 17 per cent in 1960-61 to 12 per cent in 1963-64.

12.12 All credit requirements of farmers under Intensive Agricultural District Programme have been met through cooperative financing, subject to their satisfying the requisite conditions of eligibility for cooperative credit. Practically all seeds, fertilizers and improved implements sold to farmers are being channelled through the cooperative societies. Over 75 per cent of the short term loans given by the cooperatives under the IADP are made available to the farmers in kind and the proper utilisation of these loans for productive purposes is thus being ensured. Provision has also been made to give loans without mortgage of land upto a sum of Rs. 750/- each for kharif and rabi crops, subject to the requirement on the basis of farm production plans. Recently Government have sanctioned a scheme under which members of cooperatives can get fertilizer-loans, free of interest for a period of one year, and those who cannot get loans from cooperatives can obtain fertilizer loans at 3 per cent interest for one year.

12.13 As against 9 primary marketing societies in 1959-60 there are 20 marketing societies at present, that is, one in each IADP block. The marketing societies are gradually taking up more and more functions of procurement and supply of production requisites such as fertilizers, improved seeds and agricultural implements. The lack of godowns and managerial experience and the fact that most of these societies have just been organised present some difficulties but efforts are being made to overcome them. The marketing of agricultural produce had not been attempted seriously before the introduction of the IADP in this district. A scheme of marketing and linking of credit with marketing was formulated and introduced during 1963-64. However, for want of adequate financial provision, many of the marketing societies (*Vyapar Mandals*) could not take up this work. One of the two Central Banks advanced loans to three marketing societies for this purpose. The entry of these cooperative institutions in the field of marketing showed encouraging results. The total value of agricultural produce marketed during 1963-64 was Rs. 3.60 lakhs. Due to procurement and levy order promulgated and ceiling price for paddy, rice and wheat fixed during 1963-64, agricultural produce marketed during 1964-65 amounted to only Rs. 5.42 lakhs.

#### *Rural godowns*

12.14 It is estimated that 201 godowns would be required to saturate the district. At the end of December 1964 there were 153 godowns in existence and 47 were under construction. The societies had also taken on hire a few godowns so as to provide adequate storage facilities. Ten godowns were constructed during the year 1964-65.

## II

*Results of Agronomic and Agro-economic Surveys 1961-64*

12.15 Agronomic and Agro-economic survey was initiated in the district and the control blocks in 1961-62 and since then it is being repeated annually. Only 20 out of 41 community development blocks in the district were covered by the programme and the survey was confined to these blocks. The control blocks selected initially were Bilia, Sandesh, Seosagar and Sasaram, but these were replaced in 1962-63 by a new set of control blocks, namely Naubatpur and Paliganj in Patna district and Daudnagar and Arwal in Gaya district, as the blocks initially selected were considered not suitable. Each year about 1150 cultivators' holdings were randomly selected for enquiry at the rate of 8 cultivators' holdings per village. The agro-economic results presented in the report are based on three years' data (1961-64) for programme area and two years' data (1962-64) for control blocks.

*Holding size*

12.16 The results averaged over the three years, indicated that in the programme area about 29 per cent of the cultivators' holdings were very small and the remaining holdings were evenly distributed among the three other size groups—small, medium and large. In respect of the cultivated area, large size holdings accounted for 53 per cent of the total cultivated area. On the other hand the share of the cultivated area of the very small holding group was only of the order of 7 per cent while small and medium holding size groups accounted for 14 per cent and 26 per cent. The results from the control area also indicated similar distribution except for very small size holding which was of the order of 24 per cent as against 29 per cent in the programme area.

12.17 About 90 per cent of the cultivators sampled in the district were dependent entirely on their own land for cultivation. Only 1 per cent of the cultivators depended wholly on leased-in land, while the remaining cultivators cultivated some land taken on lease in addition to their own land. Cultivators who had taken land on lease belonged mostly to very small size holding group. The land taken on lease constituted 4 per cent of the total cultivated area in the programme blocks.

*Cropping Pattern*

12.18 Annexure 12.1 gives the cropping pattern followed by cultivators in the various size groups of holdings in the district. Cropping pattern followed in different holding size classes was found to be similar. It was observed that about 98 per cent of the gross cropped area in different size groups was devoted to foodgrain crops (about 50 per cent to rice, 12 per cent to wheat, 28 per cent to pulses and 8 per cent to other foodgrains).

There was an increase in the gross cropped area from 1961-62 to 1963-64. This increase was mainly due to the additional area brought under cultivation of wheat and pulses. Increase in wheat area was mainly due to diversion of area under wheat-gram mixture to pure wheat crop, while in the case of pulses the increase was made through double-cropping.

#### *Distribution of production supplies*

12.19 Seeds of paddy and wheat and chemical fertilizers, namely, ammonium sulphate, super phosphate and fertilizer mixtures for paddy and wheat were the chief items of production supplies distributed to the cultivators. Improved seeds during both the seasons were made available to about 5 per cent of the cultivators in 1961-62 and the average quantity received per cultivator was about 34 kg. In 1962-63 and 1963-64 the position remained unchanged with regard to the percentage of the cultivators receiving improved seeds, but in 1963-64 the average quantity of improved seeds of paddy and wheat taken by cultivators was of the order of 56 kg. and 38 kg. respectively. In the kharif season about 45 per cent of the cultivators availed of supplies of nitrogenous fertilizers.

12.20 The percentage of cultivators who obtained fertilizers increased with the increase in the holding size. In kharif 1963-64 percentage of cultivators availing of supplies of nitrogenous fertilizers rose from 48 per cent for the cultivators in the small holdings to 64 per cent for the cultivators having large holdings. The average quantity of nitrogenous fertilizers obtained by cultivators in 1963-64 was about 30 per cent more than that obtained during 1962-63. Supplies of pesticides, weedicides and improved implements were availed of by less than 5 per cent of the cultivators sampled.

#### *Distribution of credit*

12.21 Data collected during the years 1962-63 and 1963-64 indicated that about 85 per cent of the requirements of the credit for the agricultural purposes were met from the loans provided by co-operative societies or Government during the year 1963-64 as against 96 per cent during the year 1962-63 (Annexure 12.2). The rest of the requirement for agricultural as well as non-agricultural purposes was met mostly by money lenders. The total loans obtained during the year from all sources was of the order of Rs. 23 per cultivator in 1962-63 and it increased to Rs. 51 in 1963-64. The total loans taken for agricultural purposes and non-agricultural purposes increased during 1963-64. The share of the loans for agricultural purposes was over 70 per cent in both the years.

12.22 A study of the relationship of loans taken and size of the cultivators holdings indicated that the amount of loan taken generally increased with the increase in holding size. In the year 1963-64 the cultiva-

tors having very small holdings took on an average a loan of Rs. 22 and the amount increased to Rs. 78 for cultivators having large holdings. The loan for agricultural purposes increased more or less proportionately with the holding size while the amount of non-agricultural loan did not show any association with holding size. The total loans taken per hectare during 1963-64 for the very small, small, medium and large size cultivators were Rs. 45, Rs. 39, Rs. 13 and Rs. 10 respectively.

*Use of manures and fertilizers:*

12.23 The use of fertilizers was popular in the district even at the commencement of the programme. During 1961-62 nearly 52 per cent of the cultivators were using chemical fertilizers. This increased to 62 per cent during 1963-64. Although a large percentage of farmers applied chemical fertilizers to their crops in combination with organic manure, a substantial proportion of them used it without any basal dressing of organic manure in kharif season of 1963-64. About 40 per cent of the fertilizer users applied fertilizer without the addition of organic manure.

12.24 Fertilizer use was relatively more common in holdings of larger sizes during 1963-64. Cultivators who used chemical fertilizers constituted 28 per cent, 52 per cent, 61 per cent and 69 per cent of the total number of cultivators in size classes—very small, small, medium and large respectively.

*Crop-wise consumption of fertilizer and manures*

12.25 Nitrogenous fertilizers were the main chemical fertilizers used by cultivators in the district. Quantities of this fertilizer distributed during 1961-62, 1962-63, and 1963-64 were of the order of 11,200 tonnes, 15,700 tonnes and 11,000 tonnes. The quantity of fertilizers consumed during 1962-63 was, however, substantially lower than the quantity distributed. This was mainly due to the outbreak of the plant disease "Dakhina" affecting the paddy crop. On account of its incidence, cultivators applied chemical fertilizers only in smaller doses. The estimated consumption for the year 1962-63 was of the order of 9,000 tonnes. The pattern of consumption of nitrogenous fertilizer had undergone a change during 1961-62 to 1963-64 as can be seen from Annexure 12.3. The bulk of the fertilizer was being consumed by the food-grain crops. Out of the total quantity of fertilizer consumed, the share of the wheat crop increased from 4 per cent in 1961-62 to 18 per cent in 1963-64. Potato and sugar-cane were the important cash crops, benefiting to an increasing extent by the fertilizer.

12.26 Consumption of phosphatic fertilizer also increased from 3600 tonnes in 1961-62 to 6000 tonnes in 1963-64. Bulk of the fertilizer continued to be consumed by food grain crops. Percentage share for wheat crop increased from 3 per cent in 1961-62 to 17 per cent in 1963-64.

12.27 Consumption of potassic fertilizer increased from 660 tonnes in 1961-62 to about 1100 tonnes in 1963-64 in the district. Its consumption was mostly confined to paddy and wheat crops.

12.28 Out of the total quantity of farm yard manure applied during the year 1963-64, 84 per cent was used on paddy crop, 7 per cent on wheat crop and 5 per cent on wheat-gram mixture.

*Percentage area benefited and average rates of application*

12.29 Increased consumption of nitrogenous and phosphatic fertilizers during the year 1963-64 compared to 1961-62 was mainly through the spread of fertilizer use in a larger area. The use of fertilizer mixture in the district had also increased considerably during the period particularly for wheat and paddy crops. In the report, the fertilizer mixture has been suitably apportioned into its components, namely nitrogen, phosphate and potash, for working out the average rate of application and the percentage area benefited. Nitrogen, phosphate and potash have been expressed in terms of ammonium sulphate, super-phosphate and muriate of potash respectively. Area under paddy crop benefited by nitrogenous fertilizer increased from 45 per cent in 1961-62 to 67 per cent in 1963-64 (Annexure 12.4). The corresponding increase in wheat crop during the same period was from 16 per cent to 48 per cent.

12.30 A study of the average rates of application of nitrogenous fertilizers in different years indicated reduction in the rates both for paddy and wheat crops during the year 1962-63. During the year 1963-64 the average rate of application of nitrogenous fertilizers increased for all crops other than paddy and wheat. For paddy crops the rate of application during the year 1963-64 was more or less of the same order as in the earlier year, while in case of wheat crop it decreased from 80 kg. to 63 kg. per hectare.

12.31 As has been mentioned earlier, the use of phosphatic fertilizer in the district had increased considerably. This was largely through the spread of use of phosphatic fertilizer to large area under paddy, wheat, potato and sugarcane crop. During the year 1961-62, less than 10 per cent of the area under these crops was benefited by the application of phosphate, while during 1963-64 the percentage area under these crops benefited by phosphatic application rose from 21 per cent to 70 per cent.

12.32 The rates of application of nitrogenous fertilizer during 1964-65 were 25 per cent for paddy and 36 per cent for wheat crop of the recommended rates (240 kg/hect. for paddy and 220 kg/hect. for wheat as ammonium sulphate). The rates of application were lower than the recommended ones in all the years. The study of the relative progress achieved in the consumption of nitrogenous fertilizer to paddy crop expressed as the percentage of saturation limit remained at about 14 per cent both during the

year 1961-62 and 1964-65. There was good progress in respect of the consumption of this fertilizer for wheat crop. The actual consumption to the potential at the saturation limit increased from 5 per cent to 18 per cent as can be seen from the table given below:

*Consumption of nitrogenous fertilizers by rice and wheat in the district expressed as percentage of the saturation limit to fertilizer at recommended rate the entire crop area in the district.*

Year	1961-62	1962-63	1963-64	1964-65*
Rice	14	8	10	14
Wheat	5	10	14	18

\*Figures are provisional.

It may be seen that the consumption level for both the crops was below 20 per cent even after the lapse of four years of the intensive programme.

#### *Holding size and use of fertilizers and manures*

12.33 The use of fertilizers and manures for the various crops in different holding size classes was studied for paddy and wheat, the principal crops grown in the district. In respect of rice there was an increase in the percentage area benefited by fertilizers with the increase in the size of holdings in the years 1962-63 and 1963-64. However, such an association was observed for wheat crop only in the year 1963-64 as may be seen from the table given below:

*Percentage area benefited by nitrogenous fertilizers according to holding size.*

Crop	Year	Very small	Small	Medium	Large
Rice	1961-62	37	50	47	45
	1962-63	35	43	55	56
	1963-64	32	55	64	73
Wheat	1961-62	12	18	15	18
	1962-63	31	27	23	32
	1963-64	29	34	46	53

12.34 The percentage area benefited by phosphatic fertilizers increased with the holding size for paddy and wheat crops, while the average rate of application showed an association of opposite kind. The rates of

application of nitrogenous and phosphatic fertilizers adopted by the cultivators of different holding size classes, for both paddy and wheat crops, were substantially lower than the recommended rates under the intensive programme.

### III

#### *Results of crop-cutting surveys, 1961-1965*

12.35 The crop-cutting surveys are being conducted every year since 1961-62. The data for the present set of control blocks are, however, available only from 1962-63. During kharif season, crop-cutting experiments were conducted on paddy crop, while in rabi season crops covered were wheat, gram, wheat-gram mixture and gram-barley mixture. The area covered by these crops in the 20 IADP blocks was of the order of 70 per cent of the gross cropped area. The results based on crop-cuts are presented in Annexures 12.5 to 12.9.

12.36 It could be seen from Annexure 12.5 that the yield rate of paddy crop decreased from 1961-62 to 1963-64 but showed a favourable trend in 1964-65; in respect of wheat and gram also the year 1964-65 was favourable. The yield rates for these crops were adjusted for the IADP district, taking into account the data relating to control area and other comparable areas. It could be seen from the Annexure that there was no trend of increase in the yield rates for any of the crops.

#### *Participants vs. non-participants*

12.37 The results relating to the proportion of fields of participant cultivators and the yield rates obtained by them are presented in Annexure 12.7. It could be observed that the percentage of fields of participant cultivators steadily increased from year to year for all the crops. Percentage of participant cultivators in 1961-62 varied from 22 per cent for rice crop to 28 per cent for gram crop. During 1964-65 the proportion of participant cultivators ranged from 46 per cent for rice crop to 54 per cent for wheat crop.

12.38 Comparison of the yield rates for different crops obtained by the participant and non-participant cultivators in the various years indicated that for the former group of cultivators, the yield rate was higher than that of latter group. This difference between the two groups has remained nearly the same for all the years. During the year 1964-65, the magnitude of the difference between the two groups varied from 2.0 quintals per hectare for rice to 3.7 quintals per hectare for wheat crop.

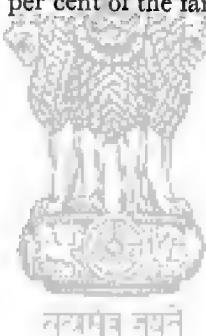
#### *Combination of agronomic practices and yield rates*

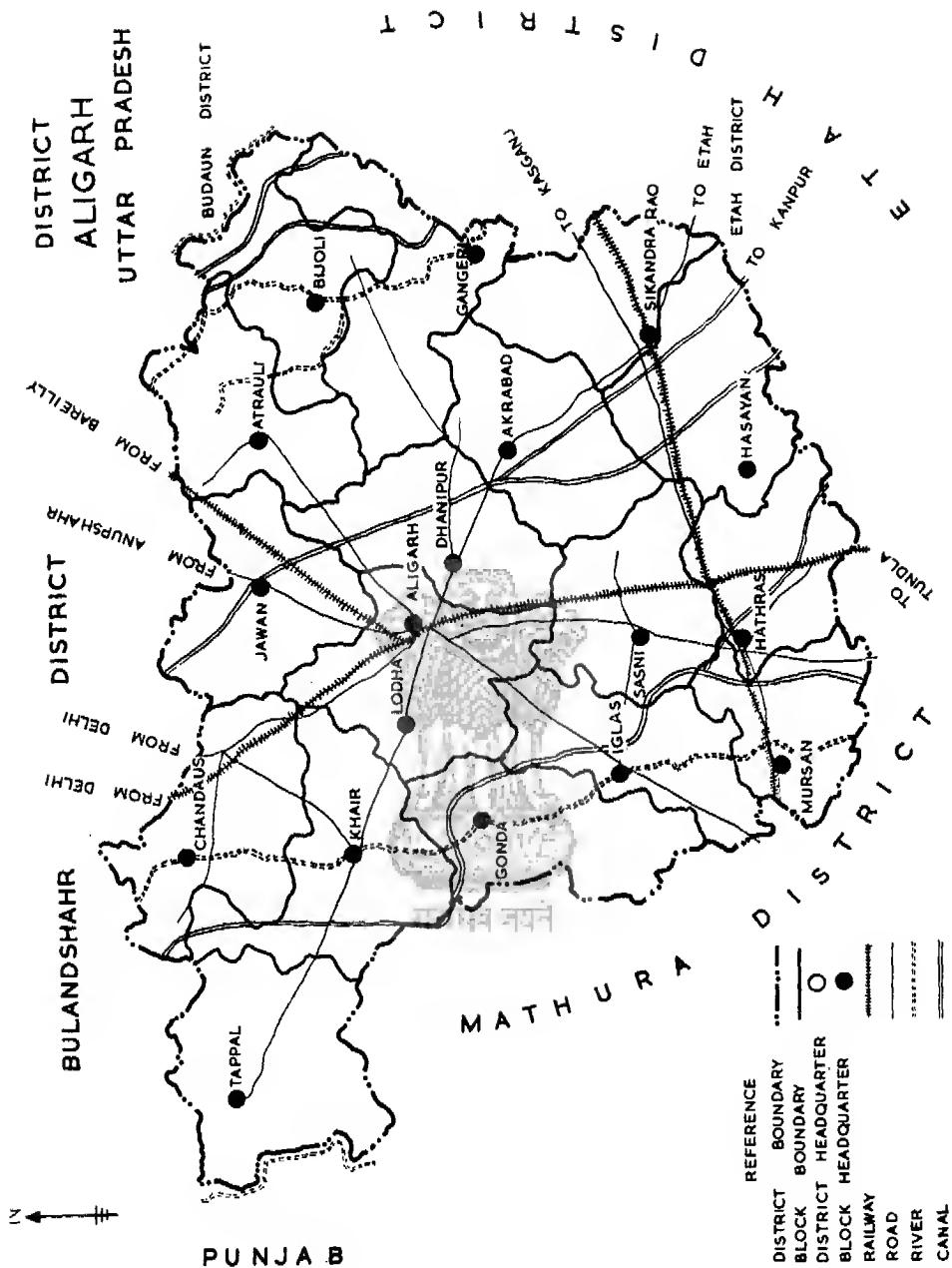
12.39 In the programme district both paddy and wheat are grown under irrigated as well as unirrigated conditions. Gram is, however, grown

mostly as rain-fed. The results relating to the combination of fertilizers and manurial practices with irrigation for rice and wheat are presented in Annexure 12.8. In case of rice crop the additional yield rates per hectare for fields benefited by fertilizer application over that in the fields not receiving this input averaged to about 3 quintals over the four years 1961-65. In respect of wheat crop, the additional yield was more than 3 quintals in all the years.

12.40 Percentage of wheat fields sown with improved seeds steadily increased from 9 per cent in 1961-62 to 25 per cent in 1964-65. Such a trend was not observed in the case of rice crop. Improved wheat strain N.P. 799 was the most common improved strain adopted by the cultivators. The average performance of improved wheat seeds distributed through co-operative societies/Government and registered seed growers was superior to that of local seeds used by the farmers by 4 quintals per hectare or more as can be seen from Annexure 12.9.

12.41 Pre-treatment of seeds with plant protection chemicals or application of pesticides and fungicides as protective or control measures were practised by less than 5 per cent of the farmers in all the years.

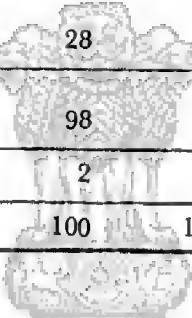




**ANNEXURE 12.1**

*Percentage area under different crops for different holding size groups in Shahabad district.*

Name of crop	Size of holdings				Pooled over all holdings
	Very Small	Small	Medium	Large	
1	2	3	4	5	6
Paddy	48	49	52	52	50
Wheat	13	13	12	10	12
Gram	1	2	1	2	2
Wheat+Gram	7	6	5	6	6
Other food grains including pulses	29	28	27	27	28
Total for food grains	98	98	97	97	98
Other crops	2	2	3	3	2
Total all crops	100	100	100	100	100



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**ANNEXURE 12.2 :**  
*Average amount of loan borrowed per cultivator from different agencies in Shahabad district during the years 1962-63 and 1963-64*

Agency	Amount (Rs.) borrowed per cultivator										
	1962-63			1963-64							
	Very small holding	Small holding	Medium holding	Large holding	Pooled	Very small holding	Small holding	Medium holding	Large holding	Pooled	
	1	2	3	4	5	6	7	8	9	10	11
Govt. or Cooperative											
	6.23	7.76	17.80	39.09	16.63	4.99	36.76	22.61	56.11	32.06	
Others	0.31	0.79	0.47	0.99	0.61	2.96	4.32	3.48	8.36	4.98	
(i) For agricultural purposes											
(ii) For non-agricultural purposes	2.22	1.49	1.77	17.66	5.42	14.33	16.67	12.86	13.88	14.34	
(iii) Total	2.53	2.23	2.24	18.65	6.03	17.29	20.99	16.34	22.24	19.32	
Pooled over all agencies											
(i) Per cultivator	8.76	10.04	20.04	57.74	22.66	22.28	57.75	38.95	78.35	51.38	
(ii) Per hectare of cultivated area	17.52	6.69	6.91	7.33	10.23	44.56	38.50	13.43	9.92	14.68	
Number of sampled cultivators	275	213	202	201	891	256	295	353	369	1273	

## ANNEXURE 12.3

*Percentage crop-wise consumption of different organic manures and chemical fertilizers in Shahabad district during the years 1961-62 to 1963-64.*

Name of crop	F.Y.M. or Compost	Nitrogenous fertilizers (as A.S or equivalent)			Phosphatic fertilizers (as single superphosphate)			Potassic fertilizers					
		1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64
	1	2	3	4	5	6	7	8	9	10	11	12	13
Paddy	95	81	84	80	75	68	75	72	75	75	67	71	67
Wheat	*	1	7	4	18	18	3	23	17	3	27	24	
Wheat-Gram	2	4	5	7	2	4	6	2	3	—	2	4	
Pulses	—	*	*	3	1	1	—	1	1	—	2	*	
Total foodgrain crops	97	86	96	94	96	91	84	98	96	78	98	95	
Potatoes	*	3	1	2	2	4	10	1	2	15	1	1	
Sugarcane	2	2	2	2	1	3	2	*	1	2	*	3	
Total cash crops	2	5	3	4	3	7	12	1	3	17	1	4	
Other crops	*	9	1	2	1	2	4	1	1	5	1	1	
Total-all crops	100	100	100	100	100	100	100	100	100	100	100	100	
Total quantity distributed (in tonnes)	4553†	4295†	6104†	11,173	15,685	10,881	3,555	5,187	6,010	660	834	1,094	

\* Percentage to the total less than 0.5.

† Figures in '00 tonnes.

*Percentage area under the various crops benefited by different manures and fertilizers and their average rates of application in Shahabad district and its control area.*

Type of area	Kind of organic manure/chemical fertilizer	Paddy						Wheat					
		1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64
I.A.D.P. district	F.Y.M. or Compost	45	61	64	30.0	18.0	22.0	1	4	21	9.0	21.0	26.0
	Green manure	—	—	1	—	—	0.19**	—	—	—	—	—	—
	Nitrogenous fertilizer (Ammonium Sulphate or equivalent)	45	53	67	0.75	0.38	0.37	16	29	48	0.72	0.80	0.63
	Phosphatic fertilizer (Superphosphate or equivalent)	5	24	50	2.18	0.37	0.39	2	16	44	1.66	0.84	0.46
	Potassic fertilizer	3	15	30	0.52	0.11	0.07	1	15	29	0.45	0.21	0.12
Control area	F.Y.M. or Compost	+	75	94	+	13.0	40.0	+	2	1	+	11.0	21.0
	Green manure	+	—	—	+	—	—	+	—	—	+	—	—
	Nitrogenous fertilizer (Ammonium Sulphate or equivalent)	+	67	66	+	0.67	0.41	+	52	14	+	0.46	0.48
	Phosphatic fertilizer (Superphosphate or equivalent)	+	—	11	+	—	0.16	+	—	7	+	—	0.54
	Potassic fertilizer	+	—	6	+	—	0.04	+	—	7	+	—	0.16

\* Percentage to total, less than 0.5.

+ Control area selected originally has subsequently been replaced.

\*\* Seed rate for the green manure crop.

**ANNEXURE 12.5**  
*Average yield in quintals per hectare in Shahabad district and comparable areas*

Crop	Year	Shahabad district*			Control area			Bihar state excluding Shahabad district			Adjusted yield of Shahabad district utilising the data relating to Bihar State excluding Shahabad district		
		Average yield	S.E.	Average yield	S.E.	Adjoining districts	Control area	Adjoining districts	Bihar State excluding Shahabad district	†	†	†	†
1	2	3	4	5	6	7	8	9	10	11			
Rice													
	Average for 3 years	—	—	—	—	8.5	—	—	—	—	—	—	—
	1958-61	—	—	—	—	—	—	—	—	—	—	—	—
	1961-62	12.9	0.19	11.6	0.46	9.1	8.7	12.6	13.1	12.9	12.1	11.8	11.8
	1962-63	11.8	0.16	11.6	0.46	8.7	8.3	12.6	12.1	13.1	11.4	11.2	11.2
	1963-64	11.2	0.20	12.3	0.55	9.0	8.6	11.5	11.5	11.4	12.8	13.5	13.5
	1964-65	13.1	0.30	14.4	0.43	12.0	9.5	12.5	12.5	12.8	12.8	13.5	13.5
	Average for 4 years	12.2	0.10	12.8	0.28	9.7	8.8	—	—	—	—	—	—
	1961-65	—	—	—	—	—	—	—	—	—	—	—	—
	Average for 3 years	—	—	—	—	6.6	—	—	—	—	—	—	—
	1958-61	—	—	—	—	—	—	—	—	—	—	—	—
	1961-62	6.8	0.15	—	—	6.4	7.6	—	—	—	—	—	—
	1962-63	7.0	0.23	6.5	0.50	8.8	7.5	—	—	—	—	—	—
	1963-64	6.8	0.20	6.5	0.28	6.4	6.0	7.1	7.3	7.0	6.5	6.8	6.8
	1964-65	7.4	0.19	8.1	0.38	7.0	5.7	7.1	7.1	7.0	7.0	6.8	6.8
	Average for 4 years	7.0	0.09	7.0	0.23	7.2	6.7	—	—	—	—	—	—
	1961-65	—	—	—	—	—	—	—	—	—	—	—	—
	Average for 3 years	—	—	—	—	4.8	—	—	—	—	—	—	—
	1958-61	—	—	—	—	—	—	—	—	—	—	—	—
	1961-62	5.3	0.19	—	—	5.0	5.6	—	—	—	—	—	—
	1962-63	5.4	0.25	6.5	0.37	6.2	5.5	—	—	—	—	—	—
	1963-64	5.1	0.10	6.2	0.32	5.1	5.0	—	—	—	—	—	—
	1964-65	5.0	0.24	7.6	0.31	5.1	4.5	—	—	—	—	—	—
	Average for 4 years	5.4	0.10	6.8	0.19	5.4	5.1	—	—	—	—	—	—
	1961-65	—	—	—	—	—	—	—	—	—	—	—	—
Gram													

\* Only 20 blocks are covered under the programme in the district.  
+ Control blocks selected originally were subsequently replaced.  
† Purnia, Gaya, Palamau and Saran.

## ANNEXURE 12.6

*Estimated total production of important crops in '00 tonnes in Shahabad district*

Year	Crop			Value of total pro- duction** (Rs. in lakhs)
	Rice	Wheat	Gram	
1	2	3	4	5
Average for 3 years 1958-61	N.A.	N.A.	N.A.	
1961-62	4289	569	229	2419
1962-63	3939	631	188	2261
1963-64	3808	639	187	2200
1964-65	4629	745	190	2647
Average for 4 years 1961-65	4166	646	199	2382
Percentage increase or de- crease in the average pro- duction in the State for the years 1961-65 over the aver- age for the years 1958-61	+3.9	+20.1	+*	

\* percentage less than 0.5

\*\* Value of total production was worked out on the basis of the harvest prices in 1960-61.

## ANNEXURE 12.7

*Yield rates of different crops separately for participant and non-participant cultivators in Shahabad district*

Crop	Year	Percentage of participant cultivators	Average yield in quintals per hectare	
			Participants	Non- participants
1	2	3	4	5
RICE	1961-62	22*	20.6	12.9
	1962-63	28	12.8	11.7
	1963-64	37	12.9	10.9
	1964-65	46	14.9	12.9
Wheat	1961-62	23*	8.5	6.3
	1962-63	31	10.0	6.7
	1963-64	33	9.4	6.0
	1964-65	54	9.5	5.8
GRAM	1961-62	28*	6.8	5.8
	1962-63	26	6.5	6.0
	1963-64	41	7.0	6.4
	1964-65	53	6.5	6.3

\* Over-estimate on account of the modified sampling procedure.

ANNEXURE 12.8  
*Percentage distribution of fields sampled in Shahabad district for different combinations of practices—Irrigation (I), Manure (M) and Fertilizer (F) and their average yields in quintals per hectare*

Practices followed	No. of fields	% to the total	1962-63		1963-64		1964-65		Pooled over all the years						
			Avg. yield	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Rice															
IMF	12	2	16.7	99	12	14.3	53	16	13.7	53	17	15.5	217	10	14.6
IMO	18	3	15.6	61	7	13.4	47	14	12.6	50	16	14.3	176	9	13.7
IOP	286	48	17.4	245	30	13.3	83	25	12.2	83	26	15.3	697	34	15.1
IOO	141	23	11.6	211	26	11.8	74	22	10.9	72	23	12.0	498	24	11.6
Total	457	76	15.5	616	75	13.0	257	77	12.2	258	82	14.2	1588	77	13.8
OMF	1	*	+	8	1	11.3	13	4	10.8	10	3	14.0	32	1	12.0
OMO	4	1	+	19	3	8.8	5	1	10.4	7	2	11.5	35	2	9.7
OOF	49	8	13.4	72	9	10.2	22	6	10.3	21	7	12.3	164	8	11.4
OOO	89	15	10.2	99	12	8.4	39	12	8.6	20	6	10.4	247	12	9.2
Total	143	24	11.3	198	25	9.2	79	23	9.5	58	18	11.8	478	23	10.2
Wheat															
IMF	15	4	9.7	17	7	9.5	14	5	11.3	26	9	9.9	72	6	10.0
IMO	16	4	7.4	6	2	10.0	7	2	7.6	9	3	5.2	38	3	7.3
IOP	74	18	9.8	70	27	10.2	92	32	9.4	120	40	9.9	356	28	9.8
IOO	92	23	6.2	64	24	6.0	82	28	5.8	69	23	5.8	307	24	5.9
Total	197	49	7.9	157	60	8.4	195	67	7.9	224	75	8.5	773	61	8.2
OMF	2	*	+	—	—	—	3	1	—	2	1	—	7	1	6.9
OMO	11	3	7.6	5	2	6.8	5	2	6.3	1	* <sup>+</sup>	22	2	7.5	
OOF	25	6	7.6	11	4	9.6	5	2	6.4	9	3	8.1	50	4	8.0
OOO	171	42	5.7	90	34	5.9	81	28	5.0	64	21	5.1	406	32	5.5
Total	209	51	6.0	106	40	6.3	94	33	5.2	76	25	5.7	485	39	5.9

\* Percentage to the total is less than 0.5.

+ Average yield has not been given since the observations are few.

**ANNEXURE 12.9**  
*Percentage distribution of fields sampled in Shahabad district according to source of seed used and average yield in quintals per hectare for each source.*

Year	1962-63			1963-64			1964-65			Pooled over all year		
	Source of seed	No. of fields	% to the total	Avg. yield	No. of fields	% to the total	Avg. yield	No. of fields	% to the total	Avg. yield	No. of fields	% to the total
1	2	3	4	5	6	7	8	9	10	11	12	13
Own source	540	69	12.0	148	55	11.6	139	54	13.4	827	63	12.2
Cooperative Society	8	1	15.3	4	1	+	10	4	14.6	22	2	14.9
Government	22	3	12.4	13	5	12.6	8	3	14.8	43	3	12.9
Regd. seed grower	3	*	+	16	6	12.9	24	9	14.2	43	3	13.7
Others	211	27	12.2	88	33	10.9	77	30	14.3	376	29	12.3
Crop: Rice												
Own source	154	59	6.9	178	61	6.4	124	49	7.2	456	56	6.8
Cooperative Society	6	2	15.6	6	2	15.0	13	5	11.8	25	3	13.5
Government	14	5	13.4	20	7	10.3	13	5	11.0	47	6	11.4
Regd. seed grower	1	*	+	13	4	8.1	15	6	11.9	29	4	10.1
Others	86	33	7.2	76	26	6.8	88	35	7.7	250	31	7.3
Crop: Wheat												
Own source	153	71	6.0	156	69	6.5	114	58	6.6	423	66	6.3
Cooperative Society	—	—	—	1	*	+	2	1	+	3	*	+
Government	5	2	7.1	4	2	+	9	4	7.2	18	3	7.2
Regd. seed grower	—	—	—	—	—	—	—	—	—	—	—	—
Others	58	27	5.9	65	29	6.3	73	37	6.6	196	31	6.3

\* Percentage less than 0.5.

+ Average yield has not been given since observations are less than 5.

## CHAPTER XIII

### RAIPUR (MADHYA PRADESH)

#### I

##### *Coverage*

13.1 The package programme was initiated in the district in the kharif season of 1961-62 in 16 out of a total number of 23 blocks. No new blocks were taken up during 1962-63 though coverage in terms of villages increased from 446 to 1,090. In the following year the programme was extended to 18 blocks covering 2,147 villages and by 1964-65 all the 23 blocks and all the 3,855 villages in the district were covered. The number of farm plans prepared in 1961-62 was 20,000 covering a cropped area of 1.03 lakh hectares. The work of farm planning was further intensified during 1963-64 when 99,340 farm plans were prepared. The gross cropped area brought under the farm plans during this year was of the order of 1.87 lakh hectares. The number of farm plans prepared during 1964-65 was 1,08,145 covering an area of 2.79 lakh hectares. The coverage of cropped area under the programme, as compared to the total gross cropped area in the district increased from 9 per cent in 1961-62 to 22 per cent in 1963-64 and to 25 per cent in 1964-65. The proportion of cultivating families in the district participating in the programme also increased from 8 per cent in 1961-62 to 38 per cent in 1963-64 and to 41 per cent in 1964-65.

##### *Demonstrations*

13.2 Considerable emphasis has been laid on the composite crop demonstration programme in the district. In the first year, 500 demonstrations were laid on paddy and 100 on wheat crop. During 1962-63, the number of demonstrations on paddy increased to 900, but those on wheat crop were only 59. Paddy being the most important crop in the district, more attention was given to demonstrations of this crop. In the year 1963-64, there were 1,164 demonstrations on paddy and 46 on wheat, and during 1964-65 there were 1,359 demonstrations on paddy and 91 on wheat. Besides, 109 demonstrations on groundnut were also laid during 1964-65. A scheme of water-use demonstration had recently been started in a 60 hectare demonstration plot in Murathi village under the command area of Khud tank. The average yield of paddy on demonstration plots during 1963-64 and 1964-65 was about 38 to 63 percent higher as compared to yields obtained from control plots. The results of demonstrations conducted during those years (1963-64 and 1964-65) had shown that a net return of

Rs. 2.0 to Rs. 3.5 was possible for each additional rupee expended on the recommended improved practices.

#### *Fertilizers*

13.3 The table below shows the progress in the offtake of fertilizers in the district from the inception of the programme:—

Year	Nitrogenous (in terms of Amm. Sulphate)	(Tonnes)	
		Phosphatic (in terms of Super phosphate)	
1960-61	5,424	479	
1961-62	8,172	2,148	
1962-63	7,376	3,773	
1963-64	9,827	8,249	
1964-65	13,936	8,294	

13.4 It could be seen that the offtake of nitrogenous fertilizers had gone up from 5,424 tonnes in 1960-61 to 9,827 tonnes in 1963-64 and to 13,936 tonnes in 1964-65. The setback in offtake in the intervening year 1962-63 was mainly due to extremely adverse weather conditions verging on a severe drought. The increase in offtake of phosphatic fertilizers during this period was, however, more sharp, the offtake rising from 479 tonnes in 1960-61 to 8,294 tonnes in 1964-65.

13.5 The distribution of fertilizers in the district is handled by the Raipur District Processing and Marketing Society at the district level, with cooperative societies at the block level as its agents. There are about 21 marketing societies and 270 village societies engaged in fertilizer distribution in the district.



#### *Improved Seeds*

13.6 Improved seeds of important crops like paddy and wheat are being supplied to farmers every year, both by the Agricultural Department and the cooperative marketing societies. The programme is, however, progressing only slowly and the premium on the purchase of paddy seed allowed to cultivators has not been attractive enough to induce them to undertake operations like roguing, grading etc. The quantity of improved seeds distributed was 1,679 tonnes in 1961-62, 845 tonnes in 1963-64 and 1,476 tonnes in 1964-65 and the area covered by improved seeds in these years was 0.12 lakh hectares, 0.13 lakh hectares and 0.16 lakh hectares respectively.

13.7 A scheme for quality seed programme has been introduced in the district and necessary staff and equipments like clipper cleaning-machine, moisture-testers etc., have been provided. In the first year of the programme it was decided to reduce the number of improved strains recommended

from 28 to 16 and accordingly, the seed farms were supplied with seeds of those 16 strains only. The number was further reduced to 8 in 1963-64 and to 6 during 1964-65. With the starting of the seed testing laboratory and the necessary equipments being provided for its efficient functioning, it is expected that a large quantity of quality seeds would be made available to the farmers in future.

#### *Plant Protection*

13.8 Steady progress has been made under the plant protection programme in the district. In the first year a beginning was made on a very modest scale. Within 2-3 years of implementation of the programme, a large number of farmers came forward to adopt plant protection measures. The area treated against pests and diseases in the district in the first year was only 3,237 hectares and it rose to 40,469 hectares by 1963-64. Similarly the use of pesticides increased from 104 tonnes to 342 tonnes during this period. Large quantities of paddy seed were also treated and distributed to farmers. In the year 1963-64 about 163 tonnes of seeds were treated as against 74 tonnes treated in 1961-62. However, the plant protection work suffered considerably during 1964-65 owing to drought conditions in the district. The area covered by plant protection measures was only 24,686 hectares and pesticides formulations used amounted only to 212 tonnes.

#### *Agricultural Implements*

13.9 Building for the workshop was completed in all respects and has been occupied towards the end of 1964. Most of the equipment for the workshop were acquired early by June, 1964 and the remaining few items like planner, jointer, pedestal grinder and pillar-type drill had been indented. The equipment acquired included, black smithy and carpentry tools and garage machinery for overhauling and repair of vehicles and tractors. The workshop was also provided with 17 tractors and trailers, 44 tractor-drawn implements and a large number of improved ploughs and other implements. Most of the staff sanctioned for the workshop was in position.

13.10 The programme of developing and testing new implements had already been taken up. Different types of seed-cum-fertilizer drills, suitable for the cloddy condition of soil and weak draught power of bullock in this area, were developed and tried and the two tynes fertilizer-cum-seed drill was found to suit the local conditions most. In summer the soil in this tract gets hard and it is not possible to plough the field with the type of plough in use. Hence a ripper attachment to the plough was developed to rip the soil and facilitate penetration of the plough. With this attachment it would be easier to work the soil during summer and prepare seed beds. Efforts made to adapt the country plough to sow seed and place fertilizers simultaneously were successful and 40 such pieces were fabricated.

for distribution. The performance of the locally fabricated seed grader-cum-winnowing machine developed on the lines of 'clipper' seed grader was so impressive that the State Seed Committee recommended its use in all State seed farms in Madhya Pradesh. Other important implements developed at the workshop were the Raipur paddy-weeder which had become quite popular, the roller-thresher and the triangular frame for use in transplantation work. A few cow-dung gas plants were also fabricated at the workshop during 1964-65 and installed in Government farms.

#### *Soil Testing Laboratory*

13.11 Pending the completion of the soil testing laboratory at Raipur, soil samples are being analysed in the laboratories at Jabalpur and Gwalior. The work was considerably stepped up during the past two years. The progress recorded in soil test work is indicated in the following table:

	1961-62	1962-63	1963-64	1964-65
No. of soil samples collected	1,622	5,696	3,533	7,408
No. of soil samples analysed	1,141	3,677	5,861	4,150
No. of recommendations made	1,141	3,677	5,861	4,150

13.12 About 15,000 recommendations, based on an equal number of soil tests, have been made so far from the beginning of the programme. The recommendations are conveyed to the cultivators expeditiously so that they may adopt the revised schedule of fertilizer application and other improved practices without any delay. Studies of correlation between the soil test results and yields obtained on the respective fields are also being made.

13.13 A new soil testing laboratory is being set up within the premises of the Agricultural College at Raipur. Construction of the building has been completed and efforts are now under-way to furnish the building and install necessary laboratory equipment. Though it was expected that the laboratory would start functioning from April, 1965, work had not been completed up to the end of June, 1965. The tempo of soil survey work will increase when this laboratory starts functioning.

#### *Cooperative Credit and Marketing*

13.14 The cooperative sector in the district has manifested significant progress since 1961-62. Cooperative credit societies covered all the villages and more than half of the cultivating families in the district. Though the number of primary cooperative credit societies has decreased from 1,035 in 1961-62 to 1,026 in 1964-65, the increase recorded in membership, share capital and deposits of these societies during this period was impressive,

Membership of these societies increased from 1.04 lakhs in 1961-62 to 1.30 lakhs in 1963-64 and to 1.43 lakhs in 1964-65 and the share capital from Rs. 33.30 lakhs to Rs. 45.35 lakhs and then to Rs. 46.97 lakhs. The level of deposits with these societies rose from Rs. 22.19 lakhs in 1961-62 to Rs. 28.83 lakhs in 1963-64 and then to Rs. 29.53 lakhs. However, the loans advanced by these societies showed a decline from Rs. 199.91 lakhs in 1961-62 to Rs. 172.13 lakhs in 1963-64 and Rs. 146.12 lakhs in 1964-65 and the percentage of overdues to demand stood high at 46 during 1964-65 as compared to 30 in the preceding year. This was largely due to crop failure in the district particularly during the first two years of the programme and the consequent inability of the farmers to pay back their loans. Large scale overdues have also led to a reduction in the volume of loans advanced in the subsequent year.

13.15 In the year 1961-62 there were 17 marketing and 3 processing societies in the district. In 1963-64 the number of marketing societies was reduced to 11 but that of the processing societies increased to 11. In the first year of the programme, these societies marketed agricultural produce worth Rs. 49 lakhs and recovered loans amounting to Rs. 9.72 lakhs through linking of credit with marketing. During 1963-64 overall business handled by these societies had more than doubled. They marketed produce worth Rs. 117.38 lakhs and recovered loans to the tune of Rs. 25.97 lakhs on behalf of the credit societies. During the year 1964-65 these societies marketed produce valued at Rs. 172.32 lakhs and recovered dues of credit societies to the extent of Rs. 41.37 lakhs.

#### *Rural Godowns*

13.16 As against 289 godowns required to saturate the district, 157 godowns existed on 30th June, 1965 which included 41 godowns completed during 1964-65; 120 godowns were construction.

## II

#### *Results of Agronomic and Agro-economic survey, 1961-64*

13.17 The agronomic and agro-economic survey was initiated during the year 1961-62 in the district and in six control blocks, namely, Masturi, Janjgir and Pamgarh in Bilaspur district, Charma and Kanker in Bastar district and Sarangarh in Raigarh district. Since then this survey is being repeated annually. In the first year, about 520 holdings in the district and 60 holdings in the control blocks at the rate of 8 holdings per village were randomly selected for enquiry. In the subsequent years of 1962-63 and 1963-64, the number of holdings selected were 670 and 980 respectively in the district and 200 and 290 respectively in the control blocks.

### *Holding size*

13.18 Results of the survey showed that about 36 per cent of the cultivators in the district had very small holdings. The remaining cultivators were nearly equally distributed in small, medium and large size holding groups. Large size holdings accounted for 56 per cent of the total cultivated area in the district while the share of very small holdings was of the order of 7 per cent. The small and medium size holdings accounted for 13 per cent and 24 per cent respectively of the total cultivated area in the district.

13.19 About 95 per cent of the cultivators sampled in the district depended for cultivation entirely on their own land. Cultivators depending entirely on leased land were negligible. The rest were cultivating some land taken on lease in addition to their own land. Cultivators who had taken land on lease belonged mostly to first three categories of holding sizes. Leased land constituted only 7 per cent of the total cultivated land in the district.

### *Cropping pattern*

13.20 Cultivators in the various size classes followed similar cropping pattern (Annexure 13.1) which did not undergo any notable change during the period of three years under study, except for a slight increase in the relative area under oilseeds (from 5 per cent of the gross cropped area in 1961-62 to 8 per cent of the corresponding area in 1963-64). In all the holding size groups, about 90 per cent of the gross cropped area was accounted for by foodgrain crops. Oilseeds, the chief commercial crop, occupied another 6 per cent of the area. The remaining area was shared by a variety of crops such as vegetables, fruits etc.

### *Distribution of production supplies* निपटाव उपलब्धि

13.21 Improved seeds of paddy, nitrogenous and phosphatic fertilizers, pesticides and insecticides were the chief items of production supplies distributed to the cultivators. Improved seed was availed of by 7 per cent of the cultivators in 1961-62 which declined to 5 per cent in 1963-64. The average quantity of improved seeds of paddy availed of by a cultivator, however, rose from 87 kg. in 1961-62 to nearly 130 kg. in 1963-64. There was a steady decline in the proportion of cultivators availing of supplies of nitrogenous fertilizers; it declined from 28 per cent in 1961-62 to 19 per cent in 1962-63 and remained of the same order in 1963-64. The proportion of cultivators availing of the supply of phosphatic fertilizers was of the order of 11 per cent in all the three years. Supplies of plant protection chemicals were availed of by less than 5 per cent of the cultivators in all the three years.

13.22 A comparison of the percentage of recipient cultivators in different holding sizes in respect of various items of supply indicated a positive association with holding size. Nitrogenous fertilizers were taken during

1963-64 by 6 per cent of the cultivators having very small holdings, while the corresponding figure for large size holding was 30 per cent.

#### *Distribution of credit*

13.23 Information on credit is being collected since the year 1962-63. The data collected during the year 1962-63 and 1963-64 indicated that the facility of agricultural credit provided by the government or cooperative societies declined during 1963-64; it was availed of by about 70 per cent of the cultivators in 1962-63 and 60 per cent in 1963-64. The rest of the cultivators availed of agricultural credit from landlords and relatives. In respect of loans for non-agricultural purposes, landlords and relatives were the main source. Borrowings provided by traders and money lenders rose from 4 per cent in 1962-63 to 18 per cent in 1963-64 for non-agricultural purposes.

13.24 Total amount of loan obtained from all sources by a cultivator was of the same order of Rs. 80 in both the years 1962-63 and 1963-64 (Annexure 13.2). Agricultural loans accounted for about 75 per cent of the total amount of loans during the first year. It declined to about 61 per cent in the year 1963-64.

13.25 A study of the loan taken by cultivators of various holding sizes indicated that amount of loan taken by them increased with holding size in both the years. The average loan taken during 1963-64 by a cultivator having a very small holding was Rs. 14. Corresponding amounts for small, medium and large size cultivators were Rs. 71, Rs. 82 and Rs. 185 respectively. The amount of loan per hectare taken by a cultivator for the holding of various sizes was, however, of the same order.

#### *Use of fertilizers and manures*

13.26 Results of the survey indicated that proportion of cultivators using fertilizers declined in the district from 29 per cent in 1961-62 to 19 per cent in 1963-64.

13.27 Farmyard manure was the chief organic manure used in the district. It was generally applied in the kharif season. Green manuring was used by 10 per cent of the cultivators in 1962-63. It declined to 4 per cent in 1963-64. The chemical fertilizers were applied mainly in combination with farmyard manure. It was noted that the use of chemical fertilizer was more popular among farmers who operated bigger size holdings.

#### *Cropwise consumption of fertilizers and manures*

13.28 There was considerable progress made in the use of nitrogenous fertilizers in the district during the three years of the programme. Almost the entire quantity of this fertilizer was applied to paddy crop.

13.29 The increase in consumption of phosphatic fertilizer recorded

from year to year was also appreciable. The quantity of phosphatic fertilizer distributed in 1961-62 was about 2,150 tonnes. It rose to 3,800 tonnes in 1962-63 and 8,250 tonnes in 1963-64. Almost the entire quantity of this fertilizer distributed in the district was applied to paddy crop.

13.30 The total quantity of farmyard manure applied in the district during the year 1963-64 was estimated at 20 lakh tonnes. Of this, about 90 per cent was applied to paddy crop.

*Percentage area benefited and average rate of application*

13.31 The use of fertilizer was restricted mostly to paddy crop in the district. Area under paddy crop benefited by nitrogenous fertilizers declined from 33 per cent during 1961-62 to 24 per cent during 1963-64.

13.32. Average rate of application of nitrogenous fertilizers to paddy crop showed an increasing trend from year to year. It rose from 47 kg. per hectare during 1961-62 to 69 kg. per hectare in the year 1963-64. These rates were much less than the recommended rates of 112 kg. per hectare for light soils and 224 kg. per hectare for heavy soils.

13.33 There was no increase in the percentage area benefited by phosphatic fertilizers under paddy crop. About 16 per cent of the area under paddy crop was benefited by this fertilizer in all the three years of the programme. The average rate of phosphatic fertilizer, however, showed an appreciable increase; it increased from 41 kg. per hectare in 1961-62 to 84 kg. per hectare during 1963-64 which was also much less than the recommended rate of 138 kg. per hectare.

13.34 Chemical fertilizers are the main input items for increasing the crop production rapidly. In the three years of the programme, for which the results are available, no progress has been made in the level of consumption of nitrogenous fertilizers. The level of consumption of nitrogenous fertilizers was already low and it remained at the same level in 1963-64. There is a wide gap between the level of consumption of fertilizers in the district and its saturation level as can be seen from the table given below:

*Consumption of fertilizers by paddy crop expressed as percentage to the quantity required for saturation.*

	1961-62	1962-63	1963-64	1964-65
Nitrogenous fertilizer	13.8	13.6	14.8	20.0
Phosphatic fertilizer	5.1	8.6	9.7	9.6

*Holding size and use of fertilizers and manures:*

13.35 Percentage area benefited by nitrogenous fertilizers as well as by phosphatic fertilizers under paddy crop increased with the increase

of holding size as may be seen from the table given below:

*Percentage area benefited under paddy crop by nitrogenous and phosphatic fertilizers in different holding size during the year 1963-64.*

Holding size	Very small	Small	Medium	Large
<b>Type of fertilizers :</b>				
Nitrogenous	7	11	20	31
Phosphatic	2	6	14	21

In case of farmyard manure, no such association was, however, observed.

### III

#### *Results of crop-cutting surveys conducted during 1961-65*

13.36 Crop-cutting survey was initiated on paddy crop in the district and the control blocks in 1961-62. The paddy crop accounted for 70 per cent of the gross cropped area in the district. The estimates of the average yield of rice are presented in Annexure 13.5. Yield rates in the district showed a slight increasing trend during the period of this programme. There was, however, a set-back in the yield rate of this crop in the district during the year 1962-63. The sharp decline in the yield rate in that year was largely due to adverse weather conditions, erratic and inadequate rainfall and widespread incidence of pests and diseases in several parts of the district.

13.37 Both average yield rate and total production of the crop increased during the period 1961-65 compared to corresponding figures for the period 1958-61, whereas the results for the adjoining districts and State as a whole (excluding the district) were in the opposite direction (Annexures 13.5 and 13.6). The increasing trend in the yield rates during the operation of the programme was also noticed when these yield rates were adjusted for seasonal effect and normal development activities with the help of the data from the comparable areas. It was, however, not statistically significant.

#### *Participant vs. non-participant cultivators*

13.38 Results presented in Annexure 13.7 indicate that proportion of fields of participant cultivators selected for crop-cutting survey on paddy dropped from 25 per cent in 1962-63 to 19 percent in 1963-64, but improved in the subsequent year to 31 per cent.

13.39 A comparison of the yield rates obtained by participant and

non-participant cultivators in the various years indicated that the difference in the yield rates between the two groups of cultivators narrowed down year after year. The difference in the yield rate in 1962-63 was of the order of 2.1 quintals per hectare which came down to 1.4 quintals per hectare in 1963-64 and it was only 0.2 quintal per hectare in 1964-65. This could be explained by the fact that in initial years relatively more progressive farmers came forward to join the programme and adopt the package of practices. As the coverage under the programme increased, less progressive farmers were also brought within its fold and this resulted in a decrease in the difference between participant and non-participant cultivators.

*Combination of Agronomic practices and their effects on yield rates*

13.40 In the district, cultivation of paddy crop mostly depends on monsoon rain. Only about 20 per cent of the area under the crop has facilities of irrigation and that also of protective nature. On an average, the fields receiving fertilizers gave an additional yield of about 2.2 quintals per hectare over those not receiving fertilizers (Annexure 13.8).

13.41 Information collected on seeds showed that during all the years, less than 10 per cent of the paddy fields sampled were sown with improved seeds. Fields sown with improved seeds obtained from authorised sources like cooperatives, Government or registered seed growers accounted for only 2 per cent of the fields selected for crop-cutting surveys. It was noticed that the fields sown with improved seeds gave higher yields compared to those sown with local varieties.

13.42 Information on incidence of pest and disease on paddy crop indicated that about 5 per cent of the fields were affected by pests and diseases in all these years except in the year 1962-63, when the severity of damage was the highest. In that year, about 20 per cent of the fields were affected. The yield rates of the affected fields were only half of those of the unaffected fields.

## ANNEXURE 13.1

*Percentage area under different crops for different holding size groups in Raipur district averaged over the three years 1961-62 to 1963-64*

Name of crop	Percentage area per holding under various crops				
	Very small holdings	Small holdings	Medium holdings	Large holdings	Pooled over all holdings
1	2	3	4	5	6
Paddy	66	67	64	65	65
Wheat	2	1	2	2	2
Other cereals and millets	2	1	3	5	4
Pulses	19	19	22	18	19
Total food grains	89	88	91	90	90
Oil seeds	7	6	5	6	6
Other crops	4	6	4	4	4
Total all crops	100	100	100	100	100

**ANNEXURE 13.2**  
*Average amount of loan borrowed per sampled cultivator from different agencies in Raigarh District during the years 1962-63 and 1963-64.*

Agency	Amount (in Rs.) borrowed per sampled cultivator						1963-64								
	1962-63						Very small holdings	Small holdings	Medium holdings	Large holdings	Pooled	Very small holdings	Small holdings	Medium holdings	Large holdings
1	2	3	4	5	6	7	8	9	10	11					
Government or Cooperative	5.90	21.71	59.15	116.62	50.87	5.82	11.14	52.98	126.77	43.75					
For agril. purposes	3.41	6.04	3.73	22.47	8.98	3.14	1.11	3.47	7.94	3.83					
Others	9.53	11.72	25.43	33.14	19.97	5.07	58.98	25.92	50.50	29.91					
Total	12.94	17.76	29.16	55.61	28.95	8.21	60.09	29.39	58.44	33.74					
Pooled over all agencies	18.84	39.47	88.31	172.23	79.82	14.03	71.23	82.37	185.21	77.41					
Per hectare of cultivated area	40.09	27.22	31.43	20.88	24.46	29.23	50.09	28.90	24.86	31.12					
Number of sampled cultivators	199	134	161	175	669	345	186	250	202	983					

**ANNEXURE 13.3**  
*Percentage crop-wise consumption of different organic manures and chemical fertilizers in Raigarh district during the years 1961-62 to 1963-64*

Crop	F.Y.M. or compost			Nitrogenous fertilizer			Phosphatic fertilizer		
	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64
1	2	3	4	5	6	7	8	9	10
Paddy	88	89	95	95	99	99	90	100	100
Other cereals	3	2	*	—	1	*	2	—	*
Pulses	5	8	3	2	—	1	3	—	*
Total food grains	96	99	98	97	100	100	95	100	100
Oil seeds	2	1	—	1	—	—	3	—	—
Other crops	2	*	2	2	—	*	2	—	—
Total all crops	100	100	100	100	100	100	100	100	100

\* Indicates % is less than 0.5

**ANNEXURE 13.4**  
*Percentage area under paddy in Raigarh district benefited by different fertilizers and manures and their average rates of application.*

Type of Area	Kind of organic manure or chemical fertilizer	Percentage area benefited			Average rate of application (Q/H)		
		1961-62	1962-63	1963-64	1961-62	1962-63	1963-64
1	2	3	4	5	6	7	8
I.A.D.P. district	F.Y.M. or Compost	76	92	84	25	17	33
	Nitrogenous fertilizer (in terms of ammonium sulphate)	33	25	24	0.47	0.61	0.69
	Phosphatic fertilizer (in terms of single super-phosphate)	17	16	16	0.41	0.74	0.84
Control area	F.Y.M. or Compost	89	89	83	29	28	17
	Nitrogenous fertilizer (in terms of ammonium sulphate)	7	10	9	0.50	0.61	0.37
	Phosphatic fertilizer (in terms of single super-phosphate)	—	—	*	—	—	—

\* less than 0.5 %

ANNEXURE 13.5  
*Average yield of rice in quintals per hectare in Raipur district and comparable areas*

Year	Raipur district		Control area		Adjoining* districts		Madhya Pradesh State excluding Raipur		Adjusted yield utilising results relating to	
	Average yield	S.E.	Average yield	S.E.	—	N.A.	—	Control area	Adjoining districts	Madhya Pradesh State excluding Raipur
1	2	3	4	5	6	7	8	9	10	
Average for 3 years 1958-61	9.1	—	—	—	9.0	8.0	—	—	—	—
1961-62	9.8	0.30	9.4	1.00	8.6	8.3	9.9	8.9	8.8	
1962-63	7.9	0.19	7.2	0.48	5.8	5.3	9.5	9.7	9.6	
1963-64	10.9	0.20	11.8	0.57	8.3	7.2	9.4	10.3	10.8	
1964-65	11.0	0.28	9.8	0.84	8.1	7.6	11.1	10.9	10.9	
Average for 4 years 1961-65	9.9	—	9.7	—	7.7	7.1	—	—	—	—

\* Bilaspur, Bastar, Durg and Raigarh.

**ANNEXURE 13.6**  
*Total production of rice crop in Raipur district*

Year	Estimated production of rice crop (in '00 tonnes)	* Value of total production (Rs. in lakhs)
1	2	3
Average for 3 years 1958-61	6286	2393
1961-62	6844	2606
1962-63	5556	2115
1963-64	7712	2936
1964-65	7838	2984
Average for 4 years 1961-65	6988	2660
Percentage increase or decrease of the average production of years 1961-65 over average for the years 1958-61	11.2	11.2
Percentage increase or decrease in average production of the State for the years 1961-65 over the average for the years 1958-61	1.30	1.30

\*State average harvest prices for the year 1960-61 have been utilised.

**ANNEXURE 13.7**  
*Yield rates of rice crop in Raipur district separately for participant and  
non-participant cultivators.*

Year	% of participant cultivators	Average yield in quintals per hectare	
		Participants	Non-participants
1	2	3	4
1962-63	25	9.8	7.7
1963-64	19	12.8	11.4
1964-65	31	12.1	11.9

## ANNEXURE 13.8

*Percentage distribution of fields sampled in Raigarh districts for different combinations of practices-Irrigation (I), Manure (M), and Fertilizer (F) and their average yield in quintals per hectare.*

Practices followed	RICE										Pooled over all years				
	1961-62					1962-63					1963-64			1964-65	
	No. of fields in the class	% age to the total	Average yield	No. of fields in the class	% age to the total	No. of fields in the class	% age to the total	No. of fields in the class	% age to the total	No. of fields in the class	% age to the total	No. of fields in the class	% age to the total	No. of fields in the class	% age to the total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IMF	53	11	13.7	42	8	10.9	33	5	13.3	22	7	15.0	150	8	13.0
IMO	33	7	11.5	59	12	8.1	70	12	11.6	18	6	17.6	180	10	11.0
IOF	31	7	11.9	8	2	8.8	11	2	13.1	14	5	14.0	64	3	12.2
IOO	27	6	8.4	39	8	7.1	49	8	11.4	22	7	10.1	137	7	9.4
Total	144	31	11.8	148	30	8.9	163	27	12.0	76	25	14.0	531	28	11.4
OMF	67	14	12.3	55	11	8.2	38	6	15.6	33	11	12.6	193	11	11.8
OMO	64	14	11.5	155	31	7.4	195	33	11.8	92	30	11.5	506	27	10.4
OOF	55	12	13.5	21	4	9.7	14	2	12.3	21	7	12.4	111	6	12.4
OOO	134	29	8.8	118	24	8.4	189	32	10.3	83	27	10.4	524	28	9.5
Total	320	69	10.9	349	70	8.0	436	73	11.5	229	75	11.3	1334	72	10.4

**ANNEXURE 13.9**  
*Percentage distribution of fields under rice sampled in Raigarh district according to the source of seed used and average yield in quintals per hectare for each source.*

Year	Source of Seed	1962-63			1963-64			1964-65		
		Number of fields	Average yield	Percentage to the total	Number of fields	Average yield	Percentage to the total	Number of fields	Average yield	Percentage to the total
1	1	2	10.3	4	5	11.5	6	7	8	9
Own Source	420	89	8.3	560	94	11.6	288	93	12.0	
Co-operative Society/Government	6	1	9.2	18	3	12.2	6	2	2	12.7
Others	45	10	8.6	16	3	11.7	14	5	5	12.5

## CHAPTER XIV

### ALIGARH (U.P.)

#### I

##### *Coverage*

14.1 After 1962-63 there has been a sizeable expansion in the coverage of the programme. It embraced 605 villages in 17 blocks of the district at the end of 1962-63. In the following year, 1963-64, the coverage was extended to all the 1,746 villages in 17 blocks of the district. In terms of gross cropped area, the coverage increased from 0.44 lakh hectares in 1962-63 to 0.86 lakh hectares in 1963-64 and to 1.67 lakh hectares or 31 percent of the total gross cropped area in the district in 1964-65.

14.2 The number of farm plans prepared during 1961-62 was 9271 which increased to 96,258 in 1963-64. During 1964-65, the project authorities had set a target of bringing within the fold of the farm planning process all the 1.50 lakh farm families in the district against which 1.06 lakh farm plans were actually prepared.

##### *Demonstrations*

14.3 The "package of practices" is being demonstrated to the farmers through composite demonstrations on important crops, both during the kharif and rabi seasons. The number of such demonstrations is limited to 4-5 per village level worker, including one special demonstration on potato or sugarcane crop. A large net-work of such 'demonstrations' has been laid out on cultivators fields. Their number increased from 1,361 in 1961-62 to 3,407 in 1964-65. The results of these demonstrations during all these years have been very encouraging and have had a good impact on farmers most of whom have taken to the recommended package of practices. The average increases in yield rates obtained on the 'demonstration plots' as compared to the 'controls' during 1963-64 (rabi) and 1964-65 (kharif) are given below :

Crop	Average yield (Quintals per hectare)		Percent increase in average yield over control
	Demonstration	Control	
<i>1963-64 (Rabi)</i>			
Wheat	21.74	12.77	70
<i>1964-65 (Kharif)</i>			
Bajra	12.62	7.83	61
Maize	17.61	9.76	80
Cotton	12.03	7.06	70
Groundnut	20.65	13.04	58

An analysis of the results of these demonstrations revealed that the cultivators on whose fields the demonstrations were laid, received, on an average, an additional income of Rs. 2.33 as against an additional investment of one rupee on improved practices.

#### *Fertilizers*

14.4 The table below shows the progress of fertiliser distribution since 1960-61.

Fertilizer	Quantity of Fertilizers Distributed (in Tonnes)				
	1960-61	1961-62	1962-63	1963-64	1964-65
Nitrogenous (in terms of amm. sulphate)	1,056	1,588	4,476	7,967	15,392
Phosphatic (in terms of super phosphate)	218	343	605	1,198	3,077

There has been a marked improvement in use of nitrogenous fertilizers in the district under the impact of the various extension measures adopted under the Package Programme. The use of phosphatic fertilizers has also shown substantial increase during this period. Fertilisers are being supplied to the cultivators by the District Cooperative Federation through 193 sale-points in the district. Besides, the Agricultural Supply Organisation of the Department of Agriculture is also engaged in distribution of fertilizers on taccavi basis. During 1964-65, a sum of Rs. 33.60 lakhs was distributed as taccavi for fertilizer as against Rs. 15.00 lakhs in 1963-64 and Rs. 4.62 lakhs in 1962-63.

#### *Improved Seeds*

14.5 The foundation seed is produced on 6 Government Agricultural Farms under the technical supervision of seed staff provided under the programme. The seed, thus produced, is further multiplied on the fields of *Khand* and *Gram Beej Sahayaks* for production of certified seed which is distributed to the cultivators through the cooperatives or is exchanged among themselves on barter basis. The system of certified seed distribution is so designed that the farmers could get fresh stock of quality seed every fifth year. There is a programme of establishing one "seed village" in each block for producing quality seed. These villages will be given priority in the supply of foundation seed. Intensive training in the methods of quality seed production will be given to extension workers and farmers of seed-villages.

*Plant Protection*

14.6 The following table shows the progress of plant protection measures in the district:

	1961-62	1962-63	1963-64	1964-65
1. Seed treated (quintals)	1,200	1,810	1,900	7,070
2. Area treated against pests and diseases (hectares)	2,400	3,622	3,582	14,140
3. Treatment of fruit trees (Number)	9,740	15,757	21,986	79,900
4. Utilization of pesticides (Tonnes)	21	87	59	121

A total number of 2,400 plant protection equipments viz; sprayers, dusters, fumigating pumps, seed treating drums etc. have been distributed. In this district, successful campaigns have been carried out for destruction of rats on an area-wide basis with the cooperation of the local institutions and progressive farmers.

14.7 At present there is one basic seed store and 8 package seed stores in each block which receive supplies of pesticides from the central seed store. Government grant taccavi loans to cultivators for purchasing plant protection equipment and pesticides.

*Implements*

14.8 The implements workshop was completed in January, 1963. A number of implements have been designed and are under trial. The hand hoe has been found successful and is being distributed to the cultivators. A seed-cum-fertilizer placement drill with single and three furrows is also under trial. Other implements designed at the workshop are fertilizer attachment on a country plough and land levelling float. As a result of the intensive demonstrations of the different types of improved implements designed at the workshop, the demand for them is increasing rapidly. During 1963-64, 3,431 improved implements were purchased by the cultivators as against 1,054 during 1962-63. The number increased to over 9,000 during 1964-65.

*Soil Testing*

14.9 The progress of setting up the soil-testing laboratory has been slow, as in most other IADP districts. The laboratory could, however, be completed with necessary fittings and equipment towards the end of 1964-65. Equipments imported from abroad have also been made available.

14.10 Pending the establishment of the laboratory in the district, the soil-testing work was undertaken in the laboratory at Kanpur. The progress achieved so far is indicated below :

	1961-62	1962-63	1963-64	1964-65
Number of soil samples collected.	2,104	903	5,534	2,505
Number analysed	2,083	903	5,280	1,676
Number of fertiliser recommendations made	2,083	903	5,280	1,676

#### *Drainage and Reclamation*

14.11 Bad drainage and existence of large areas of *usar* lands in the district are acting as serious limiting factors in stepping up agricultural production. Every year over 40,500 hectares of land get submerged under water resulting in widespread crop destruction. To tackle this problem, the existing drainage system in the district has to be remodelled. Not much attention has been paid by the State Government to finding a solution to this chronic problem.

14.12 Reclamation of *usar* land is another serious problem. This district alone accounts for 10.4 per cent of the total extent of *usar* land in the State. Efforts made so far to reclaim such lands for cultivation with local resources have not gone very far in tackling the problem. The State Government sanctioned a scheme in June, 1964 for taking up *usar* reclamation work on 'Gram Samaj' lands in the command area of tube-wells. A special Soil Conservation Officer has been appointed in the district to implement the project. The survey of land is in progress and reclamation work will be taken up.

#### *Minor Irrigation*

14.13 Special attention has been paid by the State Government to the intensification of minor irrigation works in the district in order to strengthen the base for developing a sound package of practices. Necessary facilities in this direction are being provided to the farmers in the shape of increased allotment of cement and cash loans on easy terms and conditions. The following table shows the progress made during the last four years;

	1961-62	1962-63	1963-64	1964-65
1. Construction and repair of wells (No.)	1,587	2,073	2,497	4,465
2. Installation of Persian wheels (No.)	962	1,260	1,742	2,574
3. Installation of pumping sets (No.)	28	61	116	189
4. Construction of private tubewells (No.)	9	13	28	97
5. Extension and repair of Guls. (Kilometre)	967	1,857	2,414	2,552
6. Loans advanced (Lakh Rs.)	23.50	6.15	10.50	22.60

*Cooperative credit and Marketing*

14.14 Since the inception of the package programme, concerted efforts have been made in the district to strengthen its cooperative structure. At the time of its start there were about 538 cooperative societies (including large size societies) in the district with a membership of 0.94 lakh and share capital of Rs. 37.60 lakhs. By the end of June, 1965 their number rose to 550 with a total membership of 1.15 lakhs and share capital of Rs. 51.59 lakhs. Before the introduction of the programme, cooperatives covered 80 per cent of the villages and 57 per cent of the population. The present coverage is 100 per cent of the villages and 62 per cent of the population.

14.15 There has been a steady increase in the quantum of production finance—short, medium and long term—made available to the cultivators. The amount of short term loans disbursed increased from Rs. 103.43 lakhs in 1962-63 to Rs. 149.93 lakhs in 1964-65. An encouraging feature of the loaning operation since the commencement of the programme has been its progressive production-orientation by disbursing the credit in kind in an increasing measure, as may be seen from the following figures:

Year	Kind component of total short-term credit	
	Absolute (Rs. in Lakhs)	Per cent
1961-62	2.41	2.00
1962-63	12.10	11.20
1963-64	17.14	18.70
1964-65	36.13	20.44

14.16 There have also been substantial increases in the volume of medium and long term loans advanced to the cultivators to meet their incre-

ased requirements of developmental finance. The loans advanced increased from Rs. 13.99 lakhs in 1961-62 to Rs. 39.41 lakhs in 1964-65 in the case of medium-term credit and from Rs. 0.05 lakh to Rs. 7.02 lakhs in the case of long-term credit.

14.17 The record of performance of the district in the sphere of co-operative marketing is also encouraging. The number of cooperative marketing societies increased from 6 to 7. These societies handled the produce of the members on commission as well as on outright purchase basis. The value of produce handled during the last four years is as follows:

	(Rs. in lakhs)	
	Value of produce handled on commi- ssion basis.	Value of out-right purchases.
1961-62	37.91	1.03
1962-63	38.06	4.29
1963-64	40.56	7.55
1964-65	63.54	12.35

14.18 The percentage of credit recoveries through the marketing societies has been on the decline, from 20.6 per cent in 1961-62 to 7.0 per cent in 1963-64. This has been due to such factors as imposition of sale tax, successive crop failures in 1962-63 and 1963-64, increase in cultivator's holding power and absence of a Regulated Markets Act. In order that the members may get reasonable price for their produce, an integrated scheme of cooperative marketing has been introduced under which recovery of credit dues against the members is done through the marketing societies out of the sale proceeds of the members' produce. As a result, the percentage of recoveries increased to 18.75 per cent at the end of 1964-65.

#### *Storage*

14.19 154 rural godowns are needed to saturate the district with storage facilities. 3 rail-head godowns are also proposed to be constructed for receiving the stocks and feeding the rural godowns. At the end of June 1965, 89 godowns were in existence and 10 were under construction. The entire programme will be completed by the end of 1965-66. The progress in the initial stages had been slow owing to the difficulties in getting suitable land and adequate building materials like cement and G.C. sheets. These shortages have since been over-come.

14.20. Special allotments of funds (Rs. 30 lakhs) have been made by the Government of India for construction of godowns in the Intensive Agricultural Districts including Aligarh under the special development

programme (Crash Programme) during 1965-66. The State Government have given a high priority to this scheme and provided the requisite quantities of cement and G.C. sheets for its proper implementation within the stipulated time limit.

## II

### *Results of Agronomic and Agro-Economic Surveys, 1961-64*

14.21 From the year 1961-62, the survey is being conducted annually in Aligarh district and in six control blocks, namely Danpur, Pahasu, and Jewar in Bulandshahr district, Naujheel and Kursanda in Mathura district and Kasganj in Etah district. Each year a random sample of 1200 cultivators, at the rate of 8 per village, was studied.

#### *Holding size*

14.22 The results of surveys conducted during three years 1961-62 to 1963-64 indicated that in the district about 25 per cent of the cultivators' holdings were very small, 23 per cent small, 29 per cent medium and the remaining 23 per cent large. Large size holdings accounted for 55 per cent of the total cultivated area in the district. On the other hand, the share of the cultivated area of the very small holdings was 4 per cent. The small and medium size holdings respectively accounted for 12 per cent and 29 per cent of the total cultivated area in the district. The proportion of cultivators' holdings samples from the control area falling in the various size classes was also more or less similar excepting that in the last class it was of the order of 19 per cent.

14.23 About 92 per cent of the cultivators sampled in the district depended on their own land for cultivation. The rest were cultivating some land taken on lease in addition to their own land. Cultivators depending entirely on leased land constituted less than 1 percent of the sampled cultivators. About 4 percent of the cultivated land in the district was observed to be on lease.

#### *Cropping Pattern*

14.24 The cultivators in the different size classes followed more or less similar cropping pattern (Annexure 14.1). The pattern did not undergo any notable change during the period of three years under study except for a slight increase in the area under cotton (from 2 per cent of gross cropped area in 1961-62 to 4 per cent of the corresponding area in 1963-64.)

In all the holdings, about 80 per cent of gross cropped area was accounted for by food grain crops. Sugarcane and cotton, the two chief cash crops, accounted for 4 per cent each. The remaining area was shared by vegetables, fruits, oilseeds etc.

*Distribution of Production Supplies*

14.25 The improved seeds of wheat, maize, bajra and cotton, and nitrogenous fertilizers were the chief items of production supplies distributed to cultivators. The percentage of cultivators availing of these inputs rose from year to year. As for example, improved seed of wheat was taken by 2 per cent of cultivators in 1961-62, and this increased to 34 per cent in 1962-63 and to 43 per cent in 1963-64. Similarly nitrogenous fertilizers were received only by 2 per cent of the cultivators during the year 1961-62, whereas 29 per cent of the cultivators in the kharif season and 26 per cent of the cultivators in the rabi season availed of this supply during the year 1963-64.

14.26 The percentage of cultivators who took improved seed or fertilizer increased with the holding size. For example, nitrogenous fertilizers were taken during kharif 1963-64 by 10 per cent of the cultivators with very small holdings, by 22 per cent of the cultivators having small holdings, by 37 per cent of the cultivators with medium size holdings and by 40 per cent of the cultivators with large size holdings. Similarly in the rabi season of the same year, fertilizer supplies were received by 11 per cent, 29 per cent, 32 per cent and 25 per cent of the cultivators having very small, small, medium and large size holdings respectively. Supplies of plant protection chemicals or improved agricultural implements, however, reached only a small percentage of cultivators.

*Distribution of credit*

14.27 Information on credit obtained by cultivators is being collected from the year 1962-63. Data collected during the years 1962-63 to 1963-64 indicated that out of the total number of loans taken by cultivators for agricultural purposes, 40 to 45 per cent was secured from cooperatives or Government. About 25 per cent was obtained from professional money lenders. In the remaining cases, loan was obtained from other sources which included land-lords, fellow-cultivators and traders. In respect of borrowings for non-agricultural purposes, money-lenders were the main source of credit. Advances provided by traders or their representatives were insignificant. In case of loan taken from cooperatives or Government, the rate of interest was 9 per cent. On the other hand, loans obtained from money-lenders and others carried interest ranging from 24 per cent to 36 per cent per annum.

14.28 A study of the relationship of loan taken and the size of cultivators' holdings indicated that the amount of loan taken increased with the holdings size. In the year 1963-64, the cultivators having very small holdings took, on an average, loan of Rs. 164 and the amount increased to Rs. 187 per cultivator for the next higher holding size class. The average amounts of loan taken per cultivator in the medium and large holdings size classes were Rs. 268 and Rs. 431 respectively. Loans taken per hectare for very small, small, medium and large size holdings were respectively,

Rs. 303, Rs. 120, Rs. 91 and Rs. 64. Only one-fourth of the total amount of loan taken was from Government or cooperatives.

14.29 In the year 1963-64, 34 per cent and 53 per cent of the amount of loan taken by cultivators belonging to very small and small holding size classes respectively were used for agricultural purposes. On the other hand, a little more than two-thirds of the amount of loan taken by medium and large size cultivators were used for agricultural purposes.

14.30 Though there had been increase in the past three years in the amount of agricultural credit as well as production supplies made available to cultivators in the district, a majority of the cultivators sampled during 1963-64 were not members of any cooperative society disbursing agricultural credit or supplies. It would, therefore, appear that the cooperatives in the district have still to make much headway in fulfilling their task.

#### *Use of manures and fertilizers*

14.31 The survey conducted in successive years indicated substantial changes in the pattern of consumption of fertilizers and manures in the district as well as its control area. In the year 1961-62, chemical fertilizers were used in the district by 10 per cent of the cultivators while in the subsequent two years it was used by 29 per cent and 40 per cent respectively. In the control area also there was substantial increase in the fertilizer use. The increase observed in the IADP district was of a higher order than that in the control area during the rabi season.

14.32 Farmyard manure was the chief organic manure used. It was generally applied during the kharif season. In that season during the year 1963-64, about 80 per cent of the fertilizer-users applied farmyard manure as basal dressing.

#### *Cropwise consumption of fertilizers and manures*

14.33 Analysis of the data relating to the use of fertilizers and manures was undertaken to find out how far their use was shared by different crops. During the year 1961-62, about 1,600 tonnes of nitrogenous fertilizers (in terms of ammonium sulphate) were distributed in the district and out of this quantity, 45 per cent was applied to wheat (pure or mixed with gram). Bajra (pure or mixed with arhar), maize and sugarcane accounted for 26 per cent, 10 per cent and 6 per cent respectively of the total quantity of nitrogenous fertilizers distributed during that year. The quantity of nitrogenous fertilizers distributed increased to nearly 8,000 tonnes during the year 1963-64. There was a substantial increase in the relative share of nitrogenous fertilizers applied to cash crops. The proportion of nitrogenous fertilizers used on cotton crop to the total quantity consumed during that year registered a steep increase from 1 per cent in 1961-62 to 9 per cent in 1963-64. While use of chemical fertilizers to pea

crop was almost absent during 1961-62, this crop received a small percentage of the nitrogenous fertilizer during 1963-64.

14.34 About 350 tonnes of phosphatic fertilizer (in terms of single super phosphate) was distributed in the district during 1961-62 and it was applied mostly to wheat (grown pure or mixed with gram). The quantity of phosphatic fertilizer distributed increased to 1,200 tonnes during the year 1963-64. The additional supply was utilized to a large extent for sugarcane and pea crops.

14.35 The total quantity of farmyard manure applied to the various crops grown in the district during the year 1963-64 was estimated at 1.4 million tonnes. Of this, 29 per cent was applied to maize, 28 per cent to bajra (grown pure or mixed with arhar), 16 per cent to wheat (grown pure or mixed with gram) and 9 per cent and 8 per cent respectively to cotton and sugarcane.

#### *Percentage area benefited and average rate of application*

14.36 The increased consumption of fertilizers on various crops was secured mainly by increases in the percentage area benefited (Annexure 14.4). Rise in the percentage area fertilized was noticed in respect of almost all the crops, but the increase was substantial for maize, wheat (pure), sugarcane and cotton. The area under wheat (pure) fertilized with nitrogen rose from 6 per cent in 1961-62 to 35 per cent in 1963-64. During the same period increases in the percentage of area benefited under sugarcane and cotton in the district were from 9 to 40 and from 7 to 25 respectively. Barley and wheat-gram mixture were other important crops for which increase in the percentage area benefited by nitrogenous fertilizer was observed. Even with this progress in the use of fertilizer, there is a wide gap between the present level of consumption of fertilizer in the district and its saturation level. This can be seen from the following table giving the consumption of nitrogenous fertilizers by important crops expressed as percentage of the quantity required for saturation.

#### *Consumption of nitrogenous fertilizers by different crops expressed as percentage of the quantity required for saturation (at the rates recommended in 1964-65).*

Crop	1961-62	1962-63	1963-64	1964-65
Bajra	2.4	13.8	10.2	17.0
Maize	0.9	3.3	6.6	16.2
Wheat	3.5	8.4	14.3	24.2
Barley	0.3	1.7	5.4	5.2
Sugarcane	1.7	6.6	14.5	18.5
Cotton	2.6	15.7	18.6	16.4

14.37 A study of the average rates of application (average rate applied to benefited area) of nitrogenous fertilizers to different crops in the year covered by the survey indicated an increasing trend in the case of sugarcane and cotton. The average rate of application to sugarcane increased from 67 kg. per hectare (as ammonium sulphate or equivalent) in 1961-62 to 124 kg. per hectare in 1963-64 while that to cotton rose from 37 to 70 kg. per hectare during the same period. In the case of wheat there was a slightly decreasing trend in the average rate of application (60 kg. per hectare in 1963-64 as against 71 kg. in 1961-62). The rates of application for the various crops were substantially lower than the recommended rates of application for the respective crops. In the case of wheat, the rate of application during the year 1963-64 was nearly two-thirds of the recommended rate, while in the case of maize it was about one-fourth of the recommended rate.

14.38 Use of phosphatic fertilizer, singly or as mixture, was also becoming popular for wheat crop. In the year 1961-62 only 3 per cent of the area under wheat (pure) was benefited by phosphatic fertilizer or as mixture, while in 1963-64 the corresponding percentage rose to 8. Sugarcane, pea and barley were the other crops for which phosphatic application showed an increasing trend.

#### *Holding size and use of fertilizers and manures*

14.39 Percentage area under various crops benefited by fertilizer application increased substantially with the increase in holding size for most of the crops grown in the district. This can be seen from the following table:

*Percentage area benefited by nitrogenous fertilizers in different holding size groups during the year 1963-64.*

Crop	Holding size			
	very small	small	medium	large
Bajra (pure)	6	9	16	19
Wheat	8	16	34	42
Barley	3	6	19	15

Barley, pea and bajra-arhar mixture were the other crops for which increasing trends in the percentage area benefited by nitrogenous fertilizers with holding size were well marked. For maize and the two important cash crops, namely, sugarcane and cotton, increasing trend of smaller order was observed. For crops like gram and gram-barley mixture which received

very limited fertilizer application, there was no pronounced trend with holdings size.

14.40 The average rate of application of nitrogenous fertilizers in wheat fields decreased with the increase in holding size. In the year 1962-63 the average rate decreased from 92 kg. per hectare in very small holdings to 63 kg. in large holdings. In the subsequent year the range was from 83 kg. per hectare in very small holdings to 58 kg. in large holdings.

14.41 The use of phosphatic or mixture-fertilizers was confined generally to medium and large size holdings.

14.42 Though there had been a steady increase in the use of chemical fertilizers in the district, as much as about 75 per cent of the cultivators in either of the seasons of 1963-64 did not use any chemical fertilizer. This was mainly due to the slow adoption of these improved practices by cultivators of very small and small size holdings. The following table gives the percentage of sampled cultivators of different holding size groups applying chemical fertilizers, during kharif and rabi seasons in different years.

*Percentage of cultivators applying chemical fertilizers*

year	Kharif				Rabi			
	V. Small	Small	Medi- um	Large	V. Small	Small	Medi- um	Large
1961-62	3	5	5	18	2	5	11	16
1962-63	6	17	23	27	3	10	23	22
1963-64	10	19	32	39	7	17	27	45

It can be seen from the table that the intensive programme has made a greater impact on the cultivators having large size holdings.

### III

#### *Results of crop-cutting surveys conducted during 1961-65*

14.43 The crops covered under the crop-cutting survey in the district were maize and bajra in the kharif season and wheat, barley, gram and pea in the rabi season. These crops together accounted for about 70 per cent of the gross cropped area in the district. The results of the surveys conducted during the years 1961-62 to 1964-65 are presented in Annexures 14.5 to 14.10. It may be seen from Annexure 14.5 that there were wide annual fluctuations in the yield rates of the crops studied. This was

particularly more perceptible in the case of kharif crops, the cultivation of which depends to a large extent on the monsoon. The kharif cereals covered under the crop-cutting surveys accounted for nearly 40 percent of the total area under foodgrains in the district. Hence for maintaining a steady increase in the food production of the district, it will be necessary to take steps to control flood and provide irrigation when there is drought.

14.44 On account of such wide fluctuations in the yield rates, it is difficult to study trend in yield for a short period. Attempt has, however, been made to calculate adjusted yield rates by making allowances for the seasonal fluctuations and normal developmental activities. Annexure 14.7 gives these adjusted yield rates using data in comparable areas. It can be seen that the kharif crops have not shown any favourable trend after such adjustment, whereas, the rabi crops specially wheat, barley and pea have shown increasing trend in their adjusted yield rates, although this was not perceptible before adjustment. These crops have shown annual growth rates of 8 per cent, 12 per cent and 14 per cent (compound interest rate) respectively in their adjusted yield rates.

14.45 Annexure 14.6 gives the yearly production of crops covered by the crop-cutting surveys. For almost all these crops, the average annual production during the period 1961-65, when the programme was in operation, was considerably higher than the average annual production during the period of three years preceding it. In terms of money value (at harvest prices in 1960-61), the average annual production of all these crops together during the programme period was about 29 per cent more than that in the preceding period. In contrast, in the whole of Uttar Pradesh, the average annual production of these crops together (in terms of money value) during the programme period was 1 per cent less than that in the preceding period.

#### *Participants Vs. Non-participants*

14.46 The results presented in Annexure 14.8 show that the proportion of participant cultivators among those whose fields were selected for crop-cutting survey steadily increased from year to year. The percentage of fields of participant cultivators over the total number of fields sampled for the survey varied from 7 to 16 for the various crops grown during rabi 1961-62 while the corresponding percentages during the same season in the year 1964-65 ranged from 43 to 47.

14.47 A comparison of the yield rates of different crops obtained by participant and non-participant cultivators in the various years indicated that for most of the crops the yield rates of participant cultivators were consistently higher than those of non-participants; but the difference were of a higher order in the initial years and narrowed down later. This could

be explained by the fact that in the initial years relatively more progressive farmers came forward to adopt the improved methods.

*Agronomic practices and yield rates*

14.48 In the district, wheat and barley are grown mostly as irrigated crops while bajra is raised most exclusively under rainfed conditions. Maize, pea and gram are grown in fields with irrigation facilities as well as in fields without such facilities. Results pertaining to the combination of fertilizer and manurial practices with irrigation for the various crops covered are presented in Annexure 14.9. It will be seen from the Annexure that there was pronounced effect of fertilizer use in respect of all the crops examined. The additional yield per hectare in fields benefited by fertilizer application over that in the fields not receiving this input varied from 1.0 to 3.5 quintals in the various years studied.

14.49 About 60 per cent to 75 per cent of wheat fields in different years were sown with improved strain (Pb. 591). There was a trend of a slightly higher yield rate for this variety compared to the local varieties. The improved strain T 163 of pea had also gained popularity.

14.50 Information collected on the sources of seed used in the sampled fields is summarized in Annexure 14.10. Use of wheat seed obtained from cooperatives or Government showed steady increase from year to year. During the year 1964-65, about one-fourth of the wheat fields sampled for the crop-cutting survey were sown with seed obtained from Government or cooperatives. In the case of barley and pea, the percentage of fields sown with seeds obtained from these institutions were of the order of 8 per cent to 10 per cent. For other crops the use of seed obtained from Government or cooperatives was of the order of 5 per cent or less. A comparison of the yield rates of fields sown with seed obtained from different sources indicated generally higher yield rates in the case of fields sown with seed from Government and cooperatives as compared to that of cultivators' own sources or non-institutional sources (fellow cultivators or land-lords).

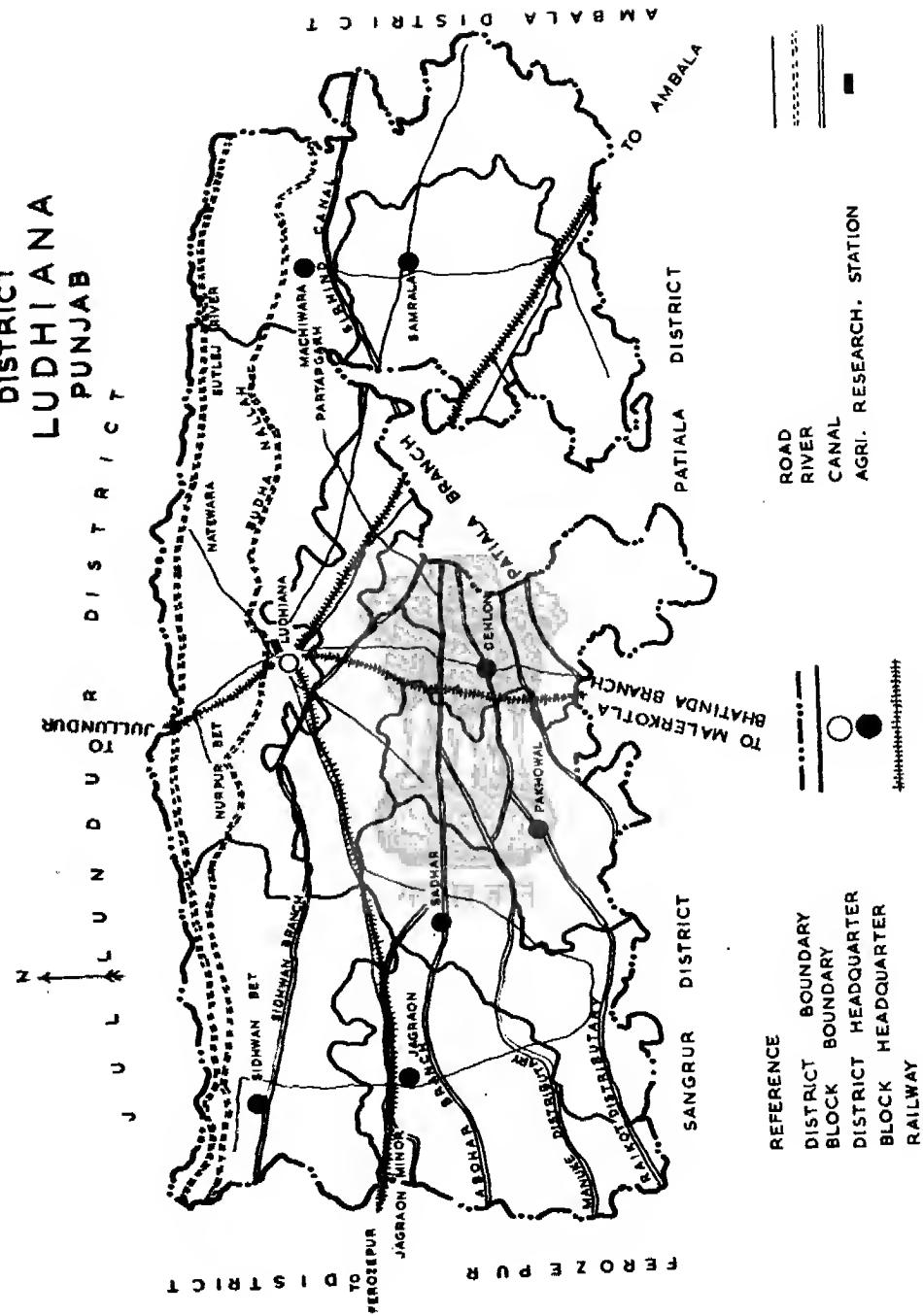
14.51 Use of plant protection chemicals by cultivators was limited to less than 5 per cent of the fields sampled for crop-cutting survey.

## ANNEXURE 14.1

*Percentage area under different crops for different holding size groups in Aligarh district averaged over the three years 1961-62 to 1963-64*

Crop	Very small size holding	Small size holding	Medium size holding	Large size holding	Pooled over all holdings	
	1	2	3	4	5	6
Bajra		12	11	8	7	8
Bajra & Arhar		10	14	14	15	14
Maize		11	9	9	7	9
Wheat		11	13	14	14	13
Barley		3	3	3	3	3
Gram		1	2	3	3	2
Pea		11	11	10	10	10
Wheat & Gram		8	8	8	10	9
Barley & Gram		1	2	2	2	2
Barley & Pea		7	6	6	5	6
Other foodgrains		5	3	4	4	4
Total foodgrains	80	82	81	80	80	
Sugarcane	3	4	4	3	4	
Cotton	2	3	3	4	4	
Fodder	1	3	4	6	4	
Other crops	14	8	8	7	8	
Total—all crops	100	100	100	100	100	

DISTRICT  
LUDHIANA  
PUNJAB



**ANNEXURE 14.2**  
*Average amount of loans borrowed per sampled cultivator in Aligarh District from different agencies during the years 1962-63 and 1963-64*

Agency	Average Amount (Rs.) borrowed per sampled cultivator						1963-64			
	Very small holding	Small holding	Medium holding	Large holding	Pooled	Very small holding	Small holding	Medium holding	Large holding	Pooled
1	2	3	4	5	6	7	8	9	10	11
Govt. or Cooperative	13.2	25.4	67.2	98.8	55.1	20.0	31.1	54.5	149.1	67.5
For agricultural purposes	44.1	78.5	120.4	165.1	107.5	36.2	69.0	132.5	142.2	102.1
Other Agencies	44.8	56.1	91.7	76.4	69.2	107.8	87.0	81.0	139.3	103.3
Total	88.9	134.6	212.1	241.5	176.7	144.0	156.0	213.5	281.5	205.4
Pooled over all agencies	102.1	160.0	279.3	340.3	231.8	164.0	187.1	268.0	430.6	272.9
per hectare of cultivated area	189.0	108.0	95.0	52.0	75.0	303.0	121.0	91.0	64.0	81.0
Number of sampled cultivators	145	189	202	210	746	160	140	243	194	738

**ANNEXURE 14.3**  
*Percentage cropwise consumption of different organic manures and chemical fertilizers in Aligarh district during the years 1961-62 to 1963-64*

Crop	F.Y.M. or Compost			Nitrogenous Fertilizer			Phosphatic Fertilizer			Mixed Fertilizer		
	% quantity consumed to the total			% quantity consumed to the total			% quantity consumed to the total			% quantity consumed to the total		
	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64
1. Maize	24	26	29	10	10	13	—	—	10	—	—	—
2. Bajra	10	16	13	7	15	7	—	—	11	3	—	7
3. Bajra+Arhar	24	11	15	19	10	11	—	—	—	—	3	5
4. Wheat (Pure)	17	13	13	35	30	30	59	52	27	83	51	40
5. Barley (Pure)	5	1	1	2	3	2	—	—	16	3	—	4
6. Gram	—	—	1	—	—	3	—	—	—	1	—	2
7. Pea	—	3	2	—	4	4	—	—	—	19	—	14
8. Wheat+Gram	5	2	3	10	7	7	41	10	2	17	—	6
9. Barley+Gram	2	+	6	+	6	1	—	—	—	—	—	3
10. Sugarcane	17	8	6	6	13	10	—	—	7	15	—	23
11. Cotton	2	4	9	1	5	9	—	—	4	12	—	6
12. Other crops	6	7	6	4	3	3	—	—	—	1	—	2
13. Total	100	100	100	100	100	100	100	100	100	100	100	100
14. Total quantity consumed/ distributed (in tonnes)	1395*	1288*	1404*	1588	4476	7967	343	605	1198	Already apportioned in nitrogenous & phosphatic fertilizers		

Notes :— + Less than 0.5 percent

\* In '000 tonnes

The quantity of F.Y.M. refers to quantity consumed during the year in the district, as estimated from the Agronomic and Agro-economic enquiry, whereas the quantities of chemical fertilizers refer to quantities distributed in the district during the year.

ANNEXURE 14.4

*Percentage area under various crops in Aligarh district benefited by different manures and fertilizers and their average rates of application.*

\* % less than 0.5.

## ANNEXE 14.4 (Contd.)

*Percentage area under various crops in Aligarh district benefited by different manures and fertilizers and their average rates of application.*

Type of area	Kind of organic manure or chemical fertilizer	MAIZE					
		% area benefited		Average rate of application (Q/H)			
		1961-62	1962-63	1963-64	1961-62	1962-63	1963-64
1	2	3	4	5	6	7	8
IADP district	F.Y.M. or Compost	64	69	69	115	114	140
	Nitrogenous Fertilizer (A.S. or equivalent)	7	18	25	0.31	0.44	0.63
	Phosphatic Fertilizer (Super phos. or equivalent)	0	*	1	—	0.92	0.66
	Mixed/complex fertilizer	0	*	1	—	1.24	0.89
Control area	F.Y.M. or Compost	88	86	81	91	126	146
	Nitrogenous Fertilizer (A.S. or equivalent)	3	9	29	0.49	0.58	0.61
	Phosphatic fertilizer (Super phos. or equivalent)	0	0	0	—	—	—
	Mixed / complex fertilizer	0	*	1	—	1.15	0.53

\* Percentage less than 0.5.

## ANNEXURE 4.4 (Contd.)

*Percentage area under various crops benefited by different manures and fertilizers in Aligarh district and their average rates of application.*

Type of area	Kind of organic manure or chemical fertilizer	WHEAT						BARLEY					
		% area benefited		Average rate of application (Q/H)		% area benefited		Average rate of application (Q/H)		1961-62		1962-63	
		1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64
1	2	3	4	5	6	7	8	9	10	11	12	13	14
F.Y.M. or Compost		25	23	26	127	90	94	11	2	9	151	146	142
JADP district	Nitrogenous Fertilizer (A.S. or equivalent)	6	19	35	0.71	0.68	0.60	1	5	14	0.45	0.56	0.56
	Phosphatic Fertilizer (Superphos. or equivalent)	1	2	3	1.12	0.80	0.39	0	1	1	—	0.92	1.03
	Mixed/Complex Fertilizer	2	3	5	1.09	1.18	0.71	0	0	1	—	—	1.39
Control area	F.Y.M. or Compost	18	28	41	98	116	164	8	6	8	104	117	153
	Nitrogenous Fertilizer (A.S. or equivalent)	3	6	23	0.69	0.60	0.48	3	*	1	0.51	—	0.46
	Phosphatic Fertilizer (Superphos. or equivalent)	0	2	0	—	0.74	—	2	0	0	0.67	—	—
	Mixed/Complex Fertilizer	3	1	1	0.78	1.23	1.06	0	0	2	—	—	0.66

\* Percentage less than 0.5

ANNEXURE 14.4 (Contd.)

*Percentage area under various crops benefited by different manures and fertilizers in Aligarh district and their average rates of application.*

Type of area	Kind of organic manure or chemical fertilizer	PEA				WHEAT+GRAM							
		% area benefited		Average rate of application (Q/H)		% area benefited			Average rate of application (Q/H)				
		1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64
IADP district	F.Y.M. or Compost	9	6	4	135	82	102	19	10	10	106	83	95
	Nitrogenous Fertilizer (A.S. or equivalent)	1	4	10	0.44	0.55	0.41	4	9	14	0.67	0.85	0.47
	Phosphatic Fertilizer (Superphos. or equivalent)	0	*	1	—	0.86	0.97	1	1	*	1.84	0.75	0.54
	Mixed/Complex Fertilizer	*	1	1	0.64	1.20	0.62	1	—	1	1.05	—	0.67
Control area	F.Y.M. or Compost	2	2	6	43	60	157	15	11	24	103	111	147
	Nitrogenous Fertilizer (A.S. or equivalent)	0	2	3	—	0.33	0.30	3	2	9	0.57	0.55	0.47
	Phosphatic Fertilizer (Superphos. or equivalent)	1	1	5	0.67	0.49	0.47	0	2	0	—	0.37	1
	Mixed/Complex Fertilizer	0	0	0	—	—	—	0	*	0	—	1.32	—

\* Percentage less than 0.5.

## ANNEXURE 14.4 (Contd.)

*Percentage area under various crops benefited by different manures and fertilizers in Aligarh district and their average rates of application.*

Type of area	Kind of organic manure or chemical fertilizer	GRAM						Average rate of application (Q/H)
		1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	
1	2	3	4	5	6	7	8	
IADP district	F.Y.M. or Compost	7	5	4	87	168	89	
	Nitrogenous Fertilizer (A.S. or equivalent)	*	2	4	0.22	0.12	1.56	
	Phosphatic Fertilizer (Superphos. or equivalent)	0	0	1	—	—	0.13	
	Mixed/Complex Fertilizer	0	0	*	—	—	0.29	
Control area	F.Y.M. or Compost	4	1	7	113	126	153	
	Nitrogenous Fertilizer (A.S. or equivalent)	0	0	1	—	—	0.46	
	Phosphatic Fertilizer (Superphos. or equivalent)	0	0	0	—	—	—	
	Mixed/Complex Fertilizer	0	0	0	—	—	—	

\* Percentage less than 0.5.

## ANNEXURE 14.4 (Contd.)

*Percentage area under various crops benefited by different manures and fertilizers in Aligarh district and their average rates of application.*

Type of area	Kind of organic manure or chemical fertilizer	BARLEY + GRAM						Average rate of application (Q/H)
		1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	
IADP District:	F.Y.M. or Compost	9	3	2	134	59	62	
	Nitrogenous Fertilizer (A.S. or equivalent)	5	1	9	0.54	0.89	0.35	
	Phosphatic Fertilizer (Superphos. or equivalent)	0	0	0	—	—	—	
	Mixed/Complex Fertilizer	0	0	1	—	—	1.10	
Control area	F.Y.M. or Compost	7	12	14	106	92	137	
	Nitrogenous Fertilizer (A.S. or equivalent)	0	1	5	—	0.46	0.31	
	Phosphatic Fertilizer (Superphos. or equivalent)	0	0	0	—	—	—	
	Mixed/Complex Fertilizer	0	0	0	—	—	—	

\* Percentage less than 0.5.

ANNEXURE 14.4 (Contd.)

*Percentage area under various crops benefited by different manures and fertilizers in Aligarh district and their average rates of application.*

ANNEXURE 14.5

*Average yield in quintals per hectare (with sampling error) of principal crops grown in Aligarh district and its control area*

Crop	Year	Aigarh district				Control area				Western Adjoining U.P. <sup>‡</sup> district	
		Area in '00 hectares	Number of experi- ments	Average yield	S.E.	Area in '00 hectares	Number of experi- ments	Average yield	S.E.	Average yield	Average yield
1	2	3	4	5	6	7	8	9	10	11	12
Bajra	Average for 3 years 1958-61	1036	—	4.6	—	319	50	5.5	0.62	4.1	4.5
	1961-62	1020	459	5.2	0.20	334	45	9.9	0.82	3.0	3.2
	1962-63	1033	456	7.9	0.24	386	48	7.9	1.08	5.3	5.4
	1963-64	1103	431	5.3	0.29	394	49	6.4	0.99	4.5	3.7
	1964-65	1095	447	5.9	0.25	—	—	—	—	5.6	6.2
	Average for 4 years 1961-65	1793*	6.1	—	—	192*	7.1	—	—	4.6	4.6
	Average for 3 years 1958-61	451	—	4.3	—	—	N.A.	—	—	6.0	6.7
Maize	1961-62	434	370	5.0	0.30	170	50	4.6	0.80	5.6	4.1
	1962-63	418	348	13.4	0.40	169	47	15.8	0.86	12.8	13.3
	1963-64	457	349	6.5	0.26	162	50	4.9	0.56	6.5	5.8
	1964-65	534	359	8.2	0.33	166	48	8.5	0.88	7.9	8.4
	Average for 4 years 1961-65	1426*	8.2	—	—	195*	8.3	—	—	7.9	8.0
	Average for 3 years 1958-61	957	—	10.3	—	349	61	15.0	1.41	9.4	10.1
	1961-62	1014	507	12.0	0.35	375	62	13.5	1.18	10.6	11.2
Wheat	1962-63	1020	476	11.9	0.28	359	61	11.5	0.50	8.8	8.3
	1963-64	1002	444	11.0	0.29	365	61	16.2	0.76	7.8	8.6
	1964-65	1045	466	16.0	0.35	—	—	—	—	11.3	12.1
	Average for 4 years 1961-65	1693*	12.8	—	—	245*	14.0	—	—	9.6	10.1

## ANNEXURE 14.5 (Continued)

1	2	3	4	5	6	7	8	9	10	11	12
<b>Barley</b>											
Average for 3 years	544	—	8.8	—							
1958-61	552	424	11.3	0.40	204	60	15.8	0.93	8.2	8.6	
1961-62	492	443	11.3	0.35	221	61	12.3	0.98	10.0	10.3	
1962-63	462	424	9.7	0.34	190	64	9.6	0.84	7.8	8.0	
1963-64	428	454	14.1	0.48	180	66	15.6	1.61	6.8	7.4	
Average for 4 years	1745*	11.5			251*	13.3			10.1	10.3	
1961-65											
<b>Gram</b>											
Average for 3 years	452	—	6.7	—							
1958-61	404	512	7.8	0.21	184	70	12.4	0.72	6.5	7.2	
1961-62	396	473	9.5	0.23	200	69	8.6	0.60	6.1	7.5	
1962-63	476	443	10.6	0.35	233	68	9.3	0.80	6.9	7.7	
1963-64	615	485	10.3	0.35	196	70	12.8	1.04	6.3	7.6	
Average for 4 years	1913*	—	9.7		277*	10.8			8.2	10.1	
1961-65											
<b>Pea</b>											
Average for 3 years	728	—	9.8	—							
1958-61	701	329	10.5	0.44	166	48	N.A.	0.91	9.3	9.9	
1961-62	722	382	9.6	0.38	158	47	15.4	0.90	8.9	8.5	
1962-63	765	377	8.3	0.29	196	46	14.7	0.88	8.4	8.7	
1963-64	556	385	14.5	0.25	168	49	8.9	0.88	6.2	7.0	
Average for 4 years	1473*	10.5			190*	13.0			10.9	11.2	
1961-65											

\* Pooled (not averaged) over the 4 years period.

† Western U.P. comprises of Agra, Meerut and Rohilkhand divisions.

‡ Adjoining districts are Bulandshah, Etah, Mathura and Budaun.

ANNEXURE 14.6  
*Annual Production (in '00 Tonnes) for different crops in Aligarh district and the value of total production.*

Year	Annual Production in '00 Tonnes in the district					Pea	Value of total production (Rs. in lakhs)
	Bajra	Maize	Wheat	Barley	Gram		
1	2	3	4	5	6	7	8
Average for 3 years 1958-61	481	195	990	478	303	715	1131
1961-62	530	217	1217	624	315	736	1303
1962-63	816	560	1214	556	376	693	1507
1963-64	585	297	1102	448	506	635	1280
1964-65	646	433	1672	603	633	806	1723
Average for 4 years 1961-65	644	378	1301	558	458	718	1454
Percentage increase (+) or decrease (-) during 1961-65 over 1958-61	+31.4 For the State +3.7	+93.8 +10.6	+31.4 +3.2	+16.7 -7.5	+51.2 -6.2	+0.4 -10.9	+28.6 -0.9

\* Value of total production has been calculated using harvest prices of 1960-61.

ANNEXURE 14.7  
*Average yield of principal crops in Aligarh and Adjoining districts in quintals per hectare.*

Crop	Year	Aligarh district	Control area	Adjoining districts	State excluding Aligarh	Adjusted yield in Aligarh using results in			
						Control* area	Adjoining districts	State excluding Aligarh	
1	2	3	4	5	6	7	8	9	
Bajra	1961-62	5.2	5.5	3.2	3.9	6.3	6.4	5.7	
	1962-63	7.9	9.9	5.4	5.8	6.2	7.2	7.7	
	1963-64	5.3	7.9	3.7	5.3	5.4	6.0	5.3	
	1964-65	5.9	6.4	6.2	5.6	6.4	4.6	5.7	
Maize	1961-62	5.0	4.6	4.1	6.6	7.4	8.2	5.4	
	1962-63	13.4	15.8	13.8	8.8	8.8	8.6	12.9	
	1963-64	6.5	4.9	5.8	7.2	8.7	8.3	6.7	
	1964-65	8.2	8.5	8.4	7.7	8.1	7.9	8.2	
Wheat	1961-62	12.0	15.0	11.2	10.1	11.6	11.1	10.7	
	1962-63	11.9	13.5	8.3	7.8	12.1	13.4	12.8	
	1963-64	11.0	11.5	8.6	6.9	12.1	12.2	12.7	
	1964-65	16.0	16.2	12.1	10.1	15.3	14.6	15.0	
Barley	1961-62	11.3	15.8	10.3	9.6	10.2	9.8	10.2	
	1962-63	11.3	12.3	8.0	7.8	11.7	11.7	11.9	
	1963-64	9.7	9.6	7.4	6.9	11.3	10.7	11.1	
	1964-65	14.1	15.6	10.3	9.5	14.9	13.0	14.9	
Gram	1961-62	7.8	12.4	7.5	5.9	7.1	7.9	8.1	
	1962-63	9.5	8.6	7.7	6.2	10.5	9.4	9.5	
	1963-64	10.6	9.3	7.6	5.4	11.3	10.5	11.4	
	1964-65	10.3	12.8	10.1	7.3	10.1	8.8	10.0	
Pea	1961-62	10.5	15.4	8.5	9.7	9.4	10.1	8.9	
	1962-63	9.6	14.7	8.7	8.3	8.9	9.0	9.3	
	1963-64	8.3	8.9	7.0	5.2	10.1	9.2	10.9	
	1964-65	14.5	12.9	11.2	8.6	13.8	12.6	14.1	

\* Adjoining districts are Bulandshahr, Etah, Mathura and Budhaun.

## ANNEXURE 14.8

*Yield rates of different crops in Aligarh district separately for Participant and Non-participant cultivators (Quintal/hectare).*

Crop	Year	Percentage of Participant Cultivators	Average yield	
			Participant	Non- Participant
1	2	3	4	5
Bajra	1961-62	N.A.	N.A.	N.A.
	1962-63	17	9.7	8.2
	1963-64	30	6.0	5.4
	1964-65	38	5.2	4.4
Maize	1961-62	N.A.	N.A.	N.A.
	1962-63	14	17.0	13.6
	1963-64	30	8.2	8.1
	1964-65	40	8.2	7.9
Wheat	1961-62	11	17.1	11.7
	1962-63	12	15.0	12.1
	1963-64	32	12.1	10.7
	1964-65	47	17.2	15.5
Barley	1961-62	7	16.7	11.9
	1962-63	14	17.3	12.7
	1963-64	25	11.6	10.8
	1964-65	46	16.8	14.9
Gram	1961-62	14	10.6	7.9
	1962-63	16	13.5	11.4
	1963-64	40	12.2	11.4
	1964-65	46	11.7	10.9
Pea	1961-62	16	10.9	11.3
	1962-63	14	12.4	11.3
	1963-64	33	10.6	8.9
	1964-65	43	15.5	14.4

## ANNEXURE 14.9

*Percentage distribution of fields sampled in Aligarh district for different combinations of practices, Irrigation (I), Manure (M) and Fertilizer (F) and their average yield in quintals per hectare*

Practices followed	1961-62			1962-63			1963-64			1964-65			Pooled over all the years		
	No. of fields	% to the total	Avg. yield	No. of fields	% to the total	Avg. yield	No. of fields	% to the total	Avg. yield	No. of fields	% to the total	Avg. yield	No. of fields	% to the total	Avg. yield
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>Maize</b>															
IMF	17	6	10.9	14	5	22.4	29	10	13.9	35	12	10.0	95	8	13.2
IMO	34	11	3.4	26	9	14.6	48	17	11.6	31	11	7.3	139	12	9.2
IOP	11	4	5.9	3	1	4.6	14	5	12.5	15	5	8.9	43	4	9.3
IOO	40	13	4.9	9	3	15.5	21	8	16.3	6	2	4.8	76	7	7.6
Total	102	34	5.5	52	18	16.8	112	40	12.1	87	30	8.5	353	31	9.9
OMF	38	13	7.3	25	9	13.0	40	14	6.1	78	27	8.4	181	16	8.3
OMO	69	23	4.9	132	47	13.6	48	17	6.6	52	18	7.2	301	26	9.4
OOF	16	5	6.0	18	6	15.0	27	10	4.2	39	14	9.0	100	8	8.3
OOO	75	25	5.5	57	20	12.5	55	19	4.8	32	11	5.5	219	19	7.1
Total	198	66	5.8	232	82	13.4	170	60	5.7	201	70	7.7	801	69	8.5
<b>Bajra</b>															
OMF	11	4	9.8	15	5	12.1	24	12	6.9	32	15	5.8	82	8	7.8
OMO	45	15	5.9	79	27	8.9	55	28	5.7	34	16	5.8	213	21	6.9
OOF	25	8	7.6	23	8	9.3	23	12	7.7	38	18	6.6	109	11	7.6
OOO	216	73	4.6	176	60	7.9	93	48	4.8	111	51	3.4	596	60	5.4
Total	297	100	5.2	293	100	8.5	195	100	5.7	215	100	4.7	1000	100	6.2

ANNEXURE 14.9 (Contd.)

ANNEXE I <sup>a</sup> , 3 (Continued)																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
IMF	6	3	19.0	22	9	13.1	22	10	12.0	38	17	18.4	88	10	15.5	
IMO	39	18	12.0	66	29	12.6	52	23	10.6	23	10	14.4	189	20	12.1	
IOF	19	9	16.5	37	16	13.8	56	24	13.3	85	37	17.8	197	22	15.6	
100	151	70	12.6	105	46	12.3	97	43	10.4	82	36	14.8	435	48	12.5	
Total	215	100	13.0	230	100	12.7	227	100	11.3	228	100	16.5	900	100	13.4	
IMF	2	2	—	4	2	—	8	5	14.2	12	7	21.1	26	4	18.3	
IMO	15	11	16.6	27	16	12.7	25	16	12.7	16	9	16.1	83	13	14.1	
IOF	4	3	—	14	8	20.1	22	14	12.9	41	24	18.6	81	13	17.2	
100	112	84	12.9	128	74	13.4	102	65	11.8	105	60	15.3	447	70	13.4	
Total	133	100	12.3	173	100	13.9	157	100	12.3	174	100	16.5	637	100	13.9	
IMF	0	0	—	—	1	—	4	2	—	2	1	—	7	1	—	
IMO	4	3	—	—	30	12	12.2	24	10	11.9	12	6	16.4	70	8	12.9
IOF	1	1	—	—	12	5	13.8	19	8	10.5	24	11	15.9	56	7	13.6
100	136	96	12.3	201	83	11.7	191	80	9.2	169	82	15.7	697	84	12.1	
Total	141	100	12.2	244	100	11.9	238	100	9.6	207	100	15.8	830	100	12.3	

## ANNEXURE 14.10

*Average yield in quintals per hectare in Aligarh district according to source of seed used.*

Crop	Source of Seed	Average yield			
		1962-63	1963-64	1964-65	Pooled
1	2	3	4	5	6
Wheat	Own	12.2 (187)	11.3 (166)	16.3 (157)	13.2 (510)
	Coop. Societies/Govt.	14.8 (18)	13.4 (25)	16.9 (53)	15.6 (96)
	Others	13.0 (36)	9.2 (43)	14.6 (25)	11.8 (104)
Barley	Own	13.1 (155)	11.4 (143)	15.9 (149)	13.5 (447)
	Coop. Societies/Govt.	18.3 (14)	8.1 (18)	17.8 (16)	14.3 (48)
	Others	11.2 (24)	10.8 (26)	13.7 (28)	12.0 (78)
Pea	Own	11.5 (210)	9.3 (203)	14.6 (213)	11.8 (626)
	Coop. Societies/Govt.	11.7 (18)	10.1 (20)	18.3 (28)	14.0 (66)
	Others	11.4 (54)	9.3 (53)	14.1 (46)	11.5 (153)

- Note:* 1. Figures in brackets indicate the number of fields.  
 2. Data are not presented for other crops since the number of fields reported to be sown with seeds obtained from Government or Cooperatives was very small.

## CHAPTER XV

### LUDHIANA (PUNJAB)

#### I

##### *Coverage*

15.1 202 villages out of 922, spread over 9 blocks in the district, were selected for implementation of the programme in the kharif of 1961-62. During 1962-63 the programme was extended to cover all the 922 villages in the district. Recently, one block in Patiala district, namely, Doraha block was transferred to Ludhiana district. This raised the overall coverage of the programme during 1964-65 to 10 blocks and 1004 villages. In the first year, i.e., 1961-62, the number of farm plans prepared was 19,926 covering an area of 1.42 lakh hectares. This increased to 39,908 farm plans during 1963-64 covering 1.96 lakh hectares. During the year 1964-65, 46,521 farm plans were prepared, the area covered being about 1.98 lakh hectares. The participation of farm families in the programme increased from about 37 per cent in 1961-62 to around 74 per cent during 1963-64 and to 86 per cent during 1964-65.

##### *Demonstrations*

15.2 The number of composite demonstrations laid out on the farmers' fields in the districts from the inception of the programme is indicated in the following table:

	Paddy	Wheat	Others	Total
1961-62	19	1049	1577	2645
1962-63	23	546	1662	2231
1963-64	23	860	1889	2772
1964-65	43	838	1219	2100

In addition to these composite demonstrations, a number of method and fertilizer demonstrations were also arranged by the district level staff for the benefit of field staff and cultivators.

15.3 The demonstrations have been, generally, very successful and the results for 1963-64 showed an increase of 29 to 65 per cent in yield per hectare of important crops as compared to controls. As per results of 1964 kharif crop demonstrations, the percentage increase in yields of important crops over controls ranged from 40 to 80 per cent. These demonstrations revealed a return of Rs. 2 to Rs. 5 for each additional rupee spent on the adoption of the package of practices.

15.4 In Ludhiana, it is reported that the demonstration programme

has reached a stage where the farmers are not eager to have result demonstrations on the basis of 50 per cent area under improved practices and 50 per cent under control. They are anxious that no part of their land should have reduced production through the provision of control plot. As such, improved practices like fertilizer application etc. are being demonstrated on a "whole farm" basis.

#### *Fertilizers*

15.5 There has been a very substantial expansion in the offtake of chemical fertilizers, both nitrogenous and phosphatic, in the district as will be seen from the following table:—

	Tonnes				
	1960-61	1961-62	1962-63	1963-64	1964-65
Nitrogenous (in terms of Ammonium Sulphate)	5232	11382	14629	16572	40413
Phosphatic (in terms of Super-phosphate)	367	2001	2437	5617	7922

It will be seen that the total offtake of nitrogenous fertilizers during 1964-65 was about 8 times that in the pre-package year. The offtake of phosphatic fertilizer increased over twenty times during the same period. The per-hectare application of fertilizers in Ludhiana was the highest in Punjab. The rapid increase in fertilizer application in the district was to a considerable extent due to the liberal policy of offering taccavi loans to the cultivators. All the extension workers from Village Level Worker upwards have been empowered to issue spot-loans ranging from Rs. 150/- (in the case of VLW) to Rs. 1,000/- (in the case of BDOs and DAOs); this has enabled farmers to obtain their credit requirements without any loss of time.

15.6 Fertilizers are distributed through 300 supply depots of which 100 have godowns of their own. These depots issue fertilizers against taccavi loans and cash loans borrowed by members from the cooperative societies.

#### *Improved seeds*

15.7 During 1964-65, 1459 tonnes of improved seeds were distributed to the farmers as against 742 tonnes in 1963-64 and 628 tonnes in 1961-62. The area covered by improved seeds was 20,046 hectares in 1964-65 as compared to 17,780 hectares in 1963-64 and 16,289 hectares in 1961-62. The target fixed was achieved in both the years 1963-64 and 1964-65.

but to accelerate the production of improved seeds the Government had taken under direct cultivation the seed farms which were given on lease to tenants; steps had also been taken to combine smaller seed farms into bigger ones and make them viable units.

15.8 In this district, improved seeds of important crops are distributed through cooperative sub-depots. From 1963-64 onwards, the cooperative societies have started purchasing seeds for sale at their sub-depots. There are 60 such cooperative societies supplying seeds in the district.

#### *Plant protection*

15.9 There has been a substantial increase in the extent of area covered under plant protection measures in Ludhiana. To facilitate ready offtake of pesticides, they are being stocked in almost all fertilizer depots in the district. The Government have allowed a subsidy of 50 per cent on pesticides sold through Governmental agencies and on manually operated plant protection equipment to popularise their use among farmers. During 1963-64 and 1964-65, over one and half lakh hectares of cropped area was covered by plant protection measures as against 1.26 lakh hectares covered during 1961-62. The quantity of seeds treated against seed-borne diseases was 1,152 tonnes during 1964-65 as against 2,550 tonnes in the preceding year and 383 tonnes in 1961-62. Pesticide-formulations used in the district for various preventive operations also increased from 9.88 tonnes in 1961-62 to 10.56 tonnes in 1963-64 and 16.82 tonnes in 1964-65.

#### *Agricultural Implements Workshop*

15.10 The implements workshop which has been set up under the programme by strengthening the existing workshop of the Punjab Agricultural University is engaged in testing and developing new implements suited to local conditions. Field trials of the fertilizer-seed drill procured through Ford Foundation were taken up extensively for sowing wheat. Besides undertaking manufacture of prototypes and training farmers and village artisans in the repair and use of implements, a single-gauge one way disc harrow has been developed at the workshop and is under trial. Two soil turning ploughs have also been developed. The development of a simplified grader on the basis of the Clipper brand of U.S.A. has been taken up. Improvements have been made on *Single* and *Sharma* hand hoes for which there is a large demand in the district. A tractor mounted spraying unit has also been developed. Improvements have been made on the olpad thresher in such a way that it can be fitted to a universal frame with a seating attachment.

#### *Soil testing*

15.11 Soil samples are being analysed at the existing soil-testing laboratory of the Agricultural University, Ludhiana. The laboratory has

been strengthened to meet the needs of the package programme. When fully equipped the laboratory would be able to carry out soil tests in respect of about 30,000 samples a year. During 1964-65, 5944 soil samples were tested and an equal number of recommendations made as against 5244 samples tested and 4559 recommendations made in 1963-64. The fertilizer recommendations on the basis of soil tests are given on a card which is sent by post, direct to individual cultivators. On this card is given the detailed soil analysis report, quantities of fertilizer in kg. to be applied per hectare and the method of application of fertilizers. Efforts are also being made to prepare a fertilizer guide-book for the district, based on soil analysis data.

#### *Minor Irrigation*

15.12 Irrigation in the district is mostly through minor irrigation works. These works, therefore, received priority in the programme. The loans advanced during the 'package' years were many times more than loans advanced during pre-package years. Consequently, there had been considerable increase in the installation of percolation wells, pumping sets and tube wells in recent years. About 8000 hectares of land were brought under irrigation during 1964-65 as compared to 4600 hectares brought under irrigation during 1963-64. The following table indicates the amount of loans advanced for irrigation purposes and the irrigation resources created since 1960-61.

	1960-61	1961-62	1962-63	1963-64	1964-65
(Pre-package year)					
Loans advanced (Rs. in lakhs)	12.46	23.15	21.20	14.00	23.93
No. of works added :					
Tube-wells	25	97	94	232	379
Pumping sets	75	500	556	487	509
Percolation wells	209	411	295	267	284

#### *Cooperative Credit, Marketing & Processing*

15.13 The strengthening of cooperatives in the district has been aimed at from the very inception of the programme. At present all the villages are fully covered by service cooperatives which supply credit and production requisites and also help in marketing of crops at remunerative rates. It is estimated that 96 per cent of the cultivating families are now covered by the cooperatives.

15.14 Keeping in view the production needs of the members for intensive farming, envisaged under the package programme, the maximum credit limit of the members was raised from Rs. 1000 to Rs. 2000. This limit was subsequently raised further to Rs. 2250 which included the credit portion required for fertilizers. However, the increased limit would operate only if all the taccavi required for fertilizers were channelised through the cooperatives. The standard of working out the credit limits was also liberalised, the credit limit being 1/3rd of the gross income of the cultivator out of the crops raised by him. Within this limit the cultivator is able to meet his seasonal short-term and medium-term needs.

15.15 The number of primary credit societies has increased from 919 in 1960-61 to 944 in 1963-64 and 1016 in 1964-65, their membership from 0.99 lakhs to 1.16 lakhs and 1.35 lakhs and share capital from Rs. 43.56 lakhs to Rs. 68.09 lakhs and 84.60 lakhs respectively. The total amount of loans advanced has also registered a rise from Rs. 126.25 lakhs in 1960-61 to Rs. 224.94 lakhs in 1963-64 and Rs. 279.19 lakhs in 1964-65. Overdues were only 13 per cent in 1964-65 as against 16 per cent in the preceding year and 27 per cent in 1962-63.

15.16 The district has 8 primary marketing societies with a total membership of 3845 and share capital of Rs. 7.94 lakhs. The value of agricultural produce handled by the marketing societies during the last four years is as follows:—

	(Rs. in lakhs)
1961-62	21.99
1962-63	16.36
1963-64	34.12
1964-65	208.24

Linking of credit with marketing was attempted in some societies. During 1964-65 the amount of credit societies' dues recovered by marketing societies was about Rs. 2.85 lakhs.

15.17 In Ludhiana some incentives are given to members of credit societies for marketing their produce through marketing societies. One per cent rebate in the rate of interest is given to those members who market their produce through marketing societies and repay their loans to credit societies out of the sale proceeds. A rebate of 75 paise per Rs. 100 in handling charges is also given to members of primary cooperatives.

#### *Storage Godowns*

15.18 As against 400 godowns required to saturate the district 124 have already been constructed by the end of June 1965 and the remaining

are under construction. During the year 1964-65, 14 godowns were added to the number existing as on 30th June, 1964.

## II

### *Results of Agronomic and Agro-economic Surveys (1961-1964)*

15.19 Agronomic and Agro-economic survey was initiated in the district in the rabi season of the year 1961-62 and since then, it is being repeated annually. The survey covered all the nine blocks of the district and three control blocks, namely Moga in Ferozepur district, Ahmedgarh in Sangrur district and Chamkaur Sahib in Ambala district. Each year about 800 cultivators' holdings in the district and about 350 holdings in the control blocks at the rate of 8 holdings per village were randomly selected. The results of the survey conducted upto 1963-64 are described in the subsequent paragraphs.

#### *Holding size*

15.20 The results of the survey indicated that in the district about 80 per cent of the holdings were large (greater than 4 hectares). Of this about 37 per cent were larger than 8 hectares. 16 per cent and 4 per cent of the holdings were of the size groups medium (2 to 4 hectares) and small (upto 2 hectares) respectively. Cultivators having holding size larger than 8 hectares accounted for about 55 per cent of the total cultivated area in the district, while the share of the cultivated area of the cultivators having holding size between 4 hectares and 8 hectares was 35 per cent. The cultivators having small size holdings accounted for only 1 per cent of the cultivated area. The remaining 9 per cent of the cultivated land was cultivated by medium size holders.

15.21 About 50 per cent of the cultivators in the district were depending on their own land for cultivation, while 4 per cent were dependent entirely on leased land. The remaining 46 per cent were cultivating partly their own land and partly land taken on lease. It was observed that about 20 per cent of the total cultivated land in the district was on lease.

#### *Cropping pattern*

15.22 In all the holding classes, about 55 per cent to 60 per cent of the gross cropped area was accounted for by foodgrain crops (Annexure 15.1). Sugarcane, cotton and groundnut accounted for about 30 per cent of the gross cropped area. The remaining area was shared by a variety of other crops such as fodder, vegetables, fruits, oil seeds, etc. Fodder alone accounted for about 13 per cent of the gross cropped area. The proportion of area under maize crop decreased with the increase in holding

size while it was otherwise in case of groundnut and wheat gram mixture. The proportionate area under fodder and cotton was of higher order in small holdings as compared to holdings of other size classes.

*Distribution of production supplies*

15.23 Improved seeds of maize, wheat and cotton and nitrogenous and phosphatic fertilizers were the chief items of production supplies distributed to the cultivators. There was no marked variation from year to year in the percentage of cultivators availing of improved seeds, but the average quantity of seeds obtained by the cultivator gradually increased. In case of seeds of wheat the average quantity taken by a cultivator increased from about 210 kg. during 1961-62 to nearly 300 kg. during 1963-64. The proportion of cultivators availing of supplies of nitrogenous fertilizers increased from 69 per cent in 1961-62 to 85 per cent in 1963-64.

15.24 Farmers having small size holdings took relatively less advantage of the supply of improved seeds made available through Government or cooperative sources. Percentage of cultivators availing of supplies of nitrogenous fertilizers increased with size of holdings. This type of fertilizers was taken during kharif 1963-64 by 50 per cent of the cultivators having small holdings, by 60 per cent of the cultivators having medium size holdings and by 75 per cent of the cultivators having large size holdings. In rabi season of the same year only, 22 per cent of the farmers having small size holdings took fertilizers while nearly 90 per cent of the farmers belonging to either of the remaining size groups obtained fertilizers supplies.

15.25 There was a remarkable progress in the use of improved implements during 1963-64. Percentage of cultivators availing of improved agricultural implements which was of the order of 20 per cent during 1961-62 almost doubled in 1963-64. On the other hand supplies of plant protection chemicals had reached only a very small fraction of the cultivators even in 1963-64.

*Distribution of credit*

15.26 Information on credit was collected from the year 1962-63. Data collected during 1962-63 and 1963-64 indicated that almost the entire requirement of credit in the district was met from cooperative societies or Government. Out of the total number of loans taken by the farmers, nearly three-fourth in the year 1962-63 and over 90 per cent in the year 1963-64 were taken for agricultural purposes.

15.27 Average loan taken by a cultivator was Rs. 406 in the year 1962-63 and Rs. 344 in the year 1963-64 (Annexure 15.2). In the year 1963-64 cultivator having a small holding took on an average a loan of Rs. 40 while a cultivator having a large holding above 8 hectares took a loan of Rs. 518. The average of borrowing per hectare of cultivated area

was higher in respect of medium and large holdings as compared to corresponding rate for cultivators having holdings above 8 hectares.

#### *Use of manures and fertilizers*

15.28 Results indicated a steady increase from year to year in the proportion of cultivators using fertilizers. Fertilizers were extensively used both in kharif and rabi seasons, but percentage of users in rabi season was relatively more. In the control area also there was a steady increase in fertilizer use. Percentage of the cultivators using the fertilizers was, however, higher in the IADP district than in the control area for all the years under study. Although the common practice was to use chemical fertilizers in conjunction with the organic manures, a substantial proportion of the cultivators in both the seasons, kharif and rabi 1963-64, were observed using chemical fertilizers alone.

#### *Cropwise consumption of fertilizers and manures*

15.29 A study of the data relating to the use of fertilizers and manures was undertaken to find out how far their consumption was shared by different crops. Nitrogenous fertilizers were the main chemical fertilizers used by the farmers (Annexure 15.3). The quantity of nitrogenous fertilizers distributed in the district during the year 1961-62 was of the order of 11,400 tonnes and it increased to 14,600 in 1962-63 and to 16,600 tonnes in 1963-64. About 60 per cent of the total quantity of nitrogenous fertilizers consumed was applied to wheat crop. 15 per cent and 20 per cent of the quantity consumed during 1962-63 and 1963-64 respectively were accounted for by maize crop. Cash crops such as sugarcane, cotton and groundnut accounted for nearly 20 per cent of the total quantity of nitrogenous fertilizers consumed.

15.30 A quantity of 2,000 tonnes of phosphatic fertilizers was distributed in 1961-62 and it went up to 2,400 tonnes in 1962-63 and to 5,600 tonnes in 1963-64. Nearly two-thirds of the total quantity distributed in all the three years was applied to wheat crop. Maize and groundnut were the other two important crops which consumed about 25 per cent of the total quantity of phosphatic fertilizers distributed.

15.31 The total quantity of farmyard manure applied to the crops in the district during the year 1963-64 was estimated at 17 lakh tonnes. Of this 55 per cent was applied to maize, 23 per cent to wheat and 10 per cent to cotton. The remaining 12 per cent was shared by other crops like sugarcane, vegetables, fodder, etc.

#### *Percentage area benefited and average rate of application*

15.32 There was a satisfactory progress in the application of fertilizers (Annexure 15.4). Increase in the percentage area benefited by fertilizers

was noticed in respect of all food grain crops. The area under wheat crop fertilized with nitrogen rose from 61 per cent in 1961-62 to 81 per cent in 1963-64. In case of maize crop also there was an increase in the proportion of area fertilized from 46 per cent in 1962-63 to 59 per cent in 1963-64. The percentage area of cash crops benefited with nitrogenous fertilizers remained more or less of the same order in both the years. For cotton crop the area fertilized was of the order of 25 per cent while for groundnut it remained at 57 per cent.

15.33 A study of the average rates of application (applied to the benefited area) of nitrogenous fertilizers to different crops in the years covered indicated an increasing trend in respect of all the crops in successive years. The average rate of application of wheat increased from 100 kg. in 1961-62 to 136 kg. per hectare during 1963-64. The average rate of application in respect of maize also increased from 108 kg. per hectare in 1962-63 to 148 kg. per hectare in 1963-64.

15.34 In the year 1961-62, percentage area under wheat benefited by application of phosphatic fertilizers was 21 and it increased to 51 in 1963-64. In case of maize, the corresponding area increased from 8 per cent in 1962-63 to 22 per cent in 1963-64. Sugarcane, cotton and groundnut were other crops for which use of phosphatic fertilizer was showing a favourable trend. The average rate of application of this fertilizer showed an increasing trend for all the crops covered, except maize and cotton.

15.35 Although considerable progress has been made in the district in the use of chemical fertilizers during the period of IAD Programme, a greater effort will have to be made to saturate the consumption level for at least principal crops of the district, namely, wheat and maize as may be seen from the table below :

*Consumption of nitrogenous fertilizers by different crops expressed as percentage to the quantity required for saturation*

Crop	1961-62	1962-63	1963-64	1964-65
Wheat	25	33	45	66
Maize	6	18	32	44

#### *Holding size and use of fertilizers and manures*

15.36 Percentage area under most of the crops benefited with fertilizer application showed a positive association with holding size. In case of wheat crop raised during 1963-64, area benefited by the application of nitrogenous fertilizers increased from 20 per cent for small holdings to

90 per cent for large holdings above 8 hectares. Corresponding figures for maize were 36 per cent and 56 per cent respectively. Similar association was also noticed in respect of the area under this crop benefited by phosphatic fertilizer application.

15.37 Farmers with small size holdings were observed to apply much higher doses of nitrogenous fertilizers to wheat crop as compared to farmers in other holding size groups as can be seen from the table below:

*Average rate of application of nitrogenous fertilizer ( $Q/H$ ) to wheat and maize in different holding size groups during the year 1963-64.*

Crops	Large			
	Small (upto 2 hectares)	Medium (2-4 hectares)	(4-8 hectares)	Above 8 hectares
Wheat	230	123	141	133
Maize	114	109	121	175

### III

#### *Results of crop cutting surveys conducted during 1961-65*

15.38 Crop cutting surveys were initiated during 1961-62 on maize, groundnut, cotton, wheat and gram. These crops together account for 82 per cent of the gross cropped area in the district. The results of these surveys conducted upto 1964-65 are presented in Annexures 15.5 to 15.9. It may be seen therefrom that there are wide annual fluctuations in the yield rates of the crops studied particularly in respect of kharif crops which depend to a large extent on monsoon rains.

15.39 Yield rates as well as the total production of all the foodgrain crops had considerably increased during the period 1961-65 compared to those for the year 1958-61 (Annexures 15.5 and 15.6). This increase was more pronounced in case of wheat crop for the IADP district whereas for the same crop there was a little increase in the adjoining districts as well as in the State as a whole (excluding the IADP district). Also there was a significant increasing linear trend in yield rate of wheat from year to year during the operation of IAD Programme. Even after adjustment for the seasonal effects and normal development activities with the help of data for comparable areas, trend in yield rate was perceptible; it was, however, statistically not significant.

*Participants vs. non-participants :*

15.40 There was a substantial increase from year to year in the proportion of participant cultivators whose fields were selected for crop cutting experiments during kharif and rabi seasons (Annexure 15.7). Percentage of fields of participant cultivators over the total fields sampled for the survey was of the order of 56 per cent for the various rabi crops during 1961-62 which increased almost to 100 per cent since 1963-64. Similar increase was observed in kharif crops also.

15.41 A comparison of the yield rates of different crops obtained by participant and non-participant cultivators in the various years indicated higher average yields in the fields of participant cultivators in respect of all the crops as compared to yields obtained in those of non-participants' fields. In case of wheat crop the yield rates for participant cultivators were higher by about 3.6 to 5.9 quintals per hectare over those obtained in the fields of non-participant cultivators.

*Combination of agronomic practices with yield rates :*

15.42 In the district, wheat, maize and cotton crops are grown largely under irrigated conditions while groundnut is raised almost exclusively under rainfed conditions. Gram is sown both in fields with irrigation facilities as well as in fields lacking such facilities. The results pertaining to the combination of fertilizers and manurial practices with irrigation for the various crops covered in the programme of crop cutting survey are presented in Annexure 15.8. It may be seen from it that there was pronounced effect of fertilizer use on yield in respect of wheat and maize crops covered. The additional yield rate per hectare obtained in fields growing wheat benefited by fertilizer application over that in the fields not receiving this input varied from 3.6 quintals during 1961-62 to 7 quintals in the year 1964-65. The additional yields obtained from maize crop ranged from 1 to 5 quintals per hectare in the various years studied.

15.43 Improved seed in respect of wheat had made a substantial impact in the district. Proportion of wheat fields sown with C-273, the most popular strain, was of the order of 60 per cent in the first year of the programme which increased to 95 per cent during 1964-65. Another good feature is that the average yield obtained in fields sown with this variety of seed was consistently higher than those sown with local seeds by about 30 per cent to 40 per cent in different years of the programme. Use of improved seed in respect of maize had, however, made little headway in the district.

15.44 About one-fourth of the area under wheat crop was sown with seed obtained from cooperative societies or Government. Fields sown with seeds obtained from these sources indicated generally higher yield rates (Annexure 15.9).

## ANNEXURE 15.1

*Percentage shares of major crops in the total area under different size groups of holdings in Ludhiana district.*

Crop	Holding size					Pooled
	Small (upto 2 hectares)	Medium (2 to 4 hectares)	Large			
1	2	3	4	5	6	
Wheat	22	35	30	29	29	
Maize	26	16	14	12	13	
Gram	1	3	4	3	3	
Wheat+Gram	3	7	9	10	10	
Total foodgrains	52	61	57	54	55	
Sugarcane	2	4	4	4	4	
Groundnut	4	8	10	15	13	
Cotton	18	12	15	14	14	
Fodder	20	14	12	12	13	
Other crops	4	1	2	1	1	
Total—all crops	100	100	100	100	100	

ANNEXURE 15.2

*Average amount of loans borrowed per sampled cultivator from different agencies during the years 1962-63 and 1963-64 in Ladhiana district*

Agency	Average amount borrowed (in Rs.) per sampled cultivator									
	1962-63					1963-64				
	Small holdings upto 2 hectares	Medium holdings 2-4 hectares	Large holdings 4-8 hectares	above 8 hectares	Pooled	Small holdings upto 2 hectares	Medium holdings 2-4 hectares	Large holdings 4-8 hectares	above 8 hectares	Pooled
1	2	3	4	5	6	7	8	9	10	11
Government or Co-operative	67.28	197.69	332.02	542.80	371.38	39.17	216.57	249.66	517.63	337.08
{ Agricultural purpose	8.19	18.26	39.81	16.67	26.43	0.00	0.00	14.42	0.00	6.50
{ Non-agricultural purpose	2.78	13.64	5.29	10.04	8.28	0.00	0.00	0.00	0.00	0.00
Total	10.97	31.90	45.10	26.71	34.71	0.00	0.00	14.42	0.00	6.50
{ Per cultivator	78.25	229.59	377.12	569.51	406.09	39.17	216.57	264.08	517.63	343.58
{ Per hectare of cultivated area	57.12	73.59	66.98	46.15	55.33	28.59	69.19	46.74	40.60	43.77
No. of sampled cultivators	36	129	324	269	758	23	75	254	211	563

## ANNEXURE 15.3

*Percentage consumption of different manures and chemical fertilizers by various crops*

Crop	IADP district						
	F.Y.M. or compost		Nitrogenous fertilizers		Phosphatic fertilizers		
	1962-63	1963-64	1962-63	1963-64	1962-63	1963-64	
1	2	3	4	5	6	7	
Maize	55	55	15	20	12	14	
Wheat	16	22	55	53	60	66	
Wheat+Gram	1	1	4	2	2	1	
Total food-grains	72	78	74	75	74	81	
Cotton	13	10	6	5	3	2	
Groundnut	1	1	9	9	8	11	
Sugarcane	3	4	3	4	1	1	
Total cash-crops	17	15	18	18	12	14	
Fodder	4	3	3	4	1	1	
Other crops	7	4	5	3	13	4	
Total-all crops	100	100	100	100	100	100	

**ANNEXURE 15.4**  
*Percentage area benefited by fertilizers and manures and their average rates of application.*

Type of area	Kind of organic or chemical fertilizers	Wheat						Maize		
		Percentage area benefited		Average rate of application (Q/H)		Percentage area benefited		Average rate of application (Q/H)		
		1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1962-63	1963-64	1962-63
1	2	3	4	5	6	7	8	9	10	11
I.A.D.P. district	F.Y.M. or Compost	30	23	33	44	114	111	90	92	228
	Nitrogenous fertilizers (in terms of ammonium sulphate)	61	74	81	1.00	1.11	1.36	46	59	1.08
	Phosphatic fertilizers (in terms of single super-phosphate)	21	23	51	0.58	0.99	1.04	8	22	1.21
								1	1	1.11
Control area	F.Y.M. or Compost	34	27	25	111	151	191	90	83	294
	Nitrogenous fertilizers (in terms of ammonium sulphate)	34	55	64	0.35	0.90	1.14	19	34	0.97
	Phosphatic fertilizers (in terms of single super-phosphate)	2	7	3	0.37	0.98	1.09	1	1	1.14
								1	1	0.79

ANNEXURE 15.4 (Contd.)  
*Percentage area benefited by fertilizer and manures and their average rates of application*

Type of Area	Kind of organic or chemical fertilizers	Cotton			Groundnut				
		Percentage area benefited	Average rate of application (Q./H)	Percentage area benefited	Average rate of application (Q./H)				
1	2	4	4	5	6	7	8	9	10
I.A.D.P.	F.Y.M. or Compost	40	32	17	160	3	4	*	65
	Nitrogenous fertilizers (in terms of ammonium sulphate)	25	25	1.05	1.23	58	57	0.65	0.79
	Phosphatic fertilizers (in terms of single super-phosphate)	2	2	1.56	1.11	13	22	0.64	0.96
Control area	F.Y.M. or Compost	41	28	241	249	9	1	145	*
	Nitrogenous fertilizers (in terms of ammonium sulphate)	15	20	1.11	0.84	12	24	0.54	0.44
	Phosphatic fertilizers (in terms of single super-phosphate)	—	—	—	—	2	—	*	—

\* Average rate of application not given since the area benefited is too small.

**ANNEXURE 15.5**  
*Average yield in quintals per hectare in Ludhiana district and comparable areas*

Crop	Year	Ludhiana district		Control area		Adjoining districts*		Punjab State excluding I.A.D.P. district		Adjusted yield utilizing results relating to	
		Average yield	S.E.	Average yield	S.E.	Adjoining districts	S.E.	Control area	Adjoining districts	State excluding I.A.D.P. district	
1	2	3	4	5	6	7	8	9	10	11	
Maize	Average for 3 years	13.8		N.A.		11.2		11.3			
	1958-61	20.1	0.42	20.9	0.97	13.1	12.0	17.0	17.9		
	1961-62	11.4	0.36	12.7	0.91	9.1	8.9	14.0	15.9	19.9	
	1962-63	20.2	0.67	19.5	1.02	13.7	13.5	18.1	17.0	16.2	
	1963-64	14.4	0.43	12.4	0.75	11.1	13.1	17.2	15.6	17.6	
	1964-65	16.5		16.4		11.7					
	Average for 4 years										
Wheat	Average for 3 years	11.6		N.A.		11.8		10.8			
	1958-61	17.6	0.30	17.6	0.52	12.6	12.1	17.7	17.1	17.5	
	1961-62	17.5	0.27	15.4	0.54	10.8	11.1	19.2	19.7	18.9	
	1962-63	20.6	0.31	16.5	0.79	12.3	11.5	21.3	20.6	21.4	
	1963-64	22.6	0.30	20.9	0.50	13.6	13.5	20.3	20.6	20.4	
	1964-65										
	Average for 4 years										
Gram	Average for 3 years	19.6		17.6		12.3		12.1			
	1958-61	6.8		N.A.		8.7		8.0			
	1961-62	10.5	0.22	11.2	0.49	8.6	7.7	10.4	9.1	9.0	
	1962-63	10.5	0.19	9.6	0.43	6.9	6.4	11.5	11.7	11.0	
	1963-64	10.7	0.19	10.1	0.30	5.4	5.0	12.0	14.1	14.1	
	1964-65	13.3	0.42	13.8	0.59	9.9	7.8	11.2	10.0	30.3	
	Average for 4 years										
	1961-65	11.3		11.2		7.7		6.7			

\* Jullundur, Ferozepur, Patiala, Ambala and Sangrur.

*Average yield in quintals per hectare in Ludhiana district and comparable areas*

Crop	Year	Ludhiana district		Control area		Adjoining districts*	Punjab State excluding IADP district	Adjusted yield utilizing results relating to
		Average yield	S.E.	Average yield	S.E.			
1	2	3	4	5	6	7	8	9
Cotton (lint)	Average for 3 years 1958-61 1961-62	2.1 3.0	0.09 0.21	N.A. 3.0	0.21	2.5 3.0	2.4 2.9	2.6
	1962-63	1.6	0.07	1.4	0.13	3.0	2.9	3.1
	1963-64	3.2	0.08	3.1	0.19	3.1	3.0	1.7
	1964-65	2.0	0.07	2.3	0.20	3.1	3.0	2.7
	Average for 4 years 1961-65	2.5		2.5		3.0	2.1	1.9
Groundnut	Average for 3 years 1958-61 1961-62 1962-63 1963-64 1964-65	9.1 12.8 12.1 13.2 15.0	0.49 0.39 0.38 0.38 0.44	N.A. 8.6 9.4 15.3 12.2	0.92 0.68 1.32 0.71	8.6 8.7 8.7 8.9 10.8	8.6 8.7 8.7 8.9 10.9	14.7 13.8 13.1 13.1 12.5
	1961-65	13.3		11.4		9.4	9.5	12.4

\* Jullundur, Ferozepur, Patiala, Ambala and Sangrur.

## ANNEXURE 15.6

*Production of various crops in Ludhiana district*

Year	Estimated production of crops in '00 tonnes					Value of total production* (Rs. in Lakhs)	
	Maize	Wheat	Gram	Cotton	Groundnut		
1	2	3	4	5	6	7	
Average	1958-61	557	1353	376	67	223	1061
	1961-62	800	2035	531	90	369	1581
	1962-63	484	2076	323	49	398	1402
	1963-64	1014	2822	439	125	635	2124
	1964-65	720	3413	505	67	802	2342
Average	1961-65	754	2586	450	83	551	1862
Percentage increase or decrease in the average production for the years 1961-65 over the average for the years 1958-61							
	35.4	91.1	19.7	23.9	147.1	75.5	
Percentage increase or decrease in the average of State production for years 1961-65 over the average for the years 1958-61							
	11.4	26.3	-25.4	36.0	84.7	7.8	

\* The State harvest prices for the year 1960-61 have been utilized.

**ANNEXURE 15.7**  
*Tyld rates of different crops in quintals per hectare separately for participant and non-participant cultivators.*

Crops	Years				
	1961-62	1962-63	1963-64	1964-65	
Maize	Percentage of participant cultivators	18	71	91	97
	Average Yield :				
	Participant	21.3	11.1	21.1	15.2
	Non-participant	19.5	11.9	20.7	9.8
Wheat (pure)	Percentage of participant cultivators	55	80	95	98
	Average Yield :				
	Participant	21.0	19.4	22.2	23.6
	Non-participant	17.3	15.8	16.3	19.1
Gram (pure)	Percentage of participant cultivators	59	82	94	99
	Average Yield :				
	Participant	10.6	10.1	9.7	12.8
	Non-participant	8.8	9.6	6.3	*
Cotton	Percentage of participant cultivators	21	70	90	96
	Average Yield :				
	Participant	3.3	1.6	3.5	2.2
	Non-participant	2.9	1.5	2.7	1.4
Groundnut	Percentage of participant cultivators	23	74	92	94
	Average Yield :				
	Participant	11.8	11.4	13.0	13.4
	Non-participant	10.3	10.4	14.5	12.8
Wheat + Gram (Mixture)	Percentage of participant cultivators	56	82	94	99
	Average Yield :				
	Participant	15.3	14.4	15.5	16.9
	Non-participant	13.4	13.3	10.2	*

\* indicates that observations are less than 5.

**ANNEXE 15.8**

*Percentage distribution of fields sampled in IADP district for different combinations of practices—Irrigation (I), Manure (M), and Fertilizer (F) and their average yield in quintals per hectare*

Practices followed	1961-62				1962-63				1963-64				1964-65				Pooled over all years			
	No. of fields in the class	% to the total	Av. yield	No. of fields in the class	% to the total	Av. yield	No. of fields in the class	% to the total	Av. yield	No. of fields in the class	% to the total	Av. yield	No. of fields in the class	% to the total	Av. yield	No. of fields in the class	% to the total	Av. yield		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
<b>Wheat</b>																				
IMF	40	13	23.2	40	12	20.6	23	8	19.3	54	16	24.7	157	13	22.5					
IMO	37	12	20.2	29	9	18.7	11	4	20.7	8	3	25.1	85	7	20.2					
IOF	117	38	20.5	164	50	20.3	181	64	23.8	218	65	24.9	680	54	22.7					
IOO	81	27	18.6	74	22	18.0	53	19	19.5	31	9	18.5	289	19	18.6					
Total	275	90	20.3	307	93	19.6	268	95	22.4	311	93	24.2	1161	93	21.6					
OMF	0	—	—	—	0	—	—	—	—	—	—	—	—	—	—	—	—	—		
OMO	3	1	*	4	1	*	2	1	*	1	*	8	3	13	1	1	1	10.6		
OOF	1	†	*	3	1	*	1	†	12	4	11.1	14	4	11.5	70	5	1	13.2		
OOO	28	9	11.0	16	5	8.7	12	4	—	—	—	—	—	—	—	—	—	10.6		
Total	32	10	11.4	23	7	8.7	15	5	10.2	23	7	13.1	93	7	11.0					

## ANNEXURE 15.3 (Contd.)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Gram</b>																
IMF	1	†	*	0	4	—	*	—	—	—	—	—	—	1	†	*
IMO	3	1	*	4	1	—	—	—	—	—	—	—	—	7	1	10.1
IOF	5	2	8.3	2	1	—	10	4	13.0	10	4	15.4	27	3	12.8	10.8
IOO	101	40	10.5	89	36	9.8	114	43	10.4	79	30	13.1	383	37	383	37
Total	110	43	10.5	95	38	10.3	124	47	10.6	89	34	13.4	418	41	10.9	
<b>Groundnut</b>																
IMF	1	—	*	0	0	—	—	—	—	—	—	—	—	1	2	*
IMO	2	—	*	0	4	—	*	—	—	—	—	—	—	12.2	11	1
IOF	2	1	*	4	2	—	1	†	4	—	—	—	—	12.5	65	58
IOO	138	55	9.4	149	60	9.7	139	53	8.5	170	65	12.5	596	58	10.1	
Total	143	57	9.5	153	62	9.7	140	53	8.5	174	66	12.5	610	59	10.1	
<b>Groundnut</b>																
IMF	0	—	—	1	†	*	—	—	—	2	1	19.3	3	†	16.4	
IMO	1	—	9.0	3	1	*	—	—	—	2	1	16.0	7	1	17.2	
IOF	5	3	11.5	11	4	19.8	19	9	13.9	36	17	14.6	71	8	15.0	
IOO	3	2	13.1	9	4	5.2	19	9	12.9	12	5	13.3	43	5	11.4	
Total	9	5	11.8	24	9	14.1	39	19	13.5	52	24	14.5	124	14	13.9	
OMF	0	—	—	1	†	*	1	†	*	1	†	8.5	3	†	10.7	
OMO	5	3	10.9	0	—	—	2	—	—	0	0	0	7	1	11.5	
OOF	48	28	13.5	110	40	12.4	69	33	14.6	79	36	15.3	306	35	13.8	
OOO	108	64	10.7	141	51	9.4	97	47	12.0	86	40	10.9	432	50	10.6	
Total	161	95	11.5	252	91	10.7	169	81	13.0	166	76	13.0	748	86	11.9	

ANNEXURE 15.8 (Contd.)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IMF	39	14	22.7	86	32	14.5	129	40	22.1	145	47	16.3	399	34	18.4	
IMO	123	43	20.9	129	49	9.1	129	40	20.8	63	20	11.9	444	37	16.2	
IOF	22	8	19.4	14	5	9.7	32	10	19.7	61	20	17.4	129	11	17.5	
IOO	39	14	19.2	27	10	10.9	28	9	19.6	14	5	12.9	108	9	16.4	
Total	223	79	20.8	256	96	11.1	318	99	21.1	283	92	15.4	1080	91	17.2	
OMF	12	4	16.2	6	2	10.0	—	—	—	—	11	3	13.0	29	2	13.7
OMO	22	8	17.1	3	1	* —	—	2	15.0	5	2	9.7	32	3	15.9	
OOF	9	3	16.5	0	—	—	—	—	—	2	1	13.7	11	1	15.9	
OOO	17	6	15.2	2	1	* —	—	2	13.7	8	2	8.4	29	3	13.0	
Total	60	21	16.3	11	4	12.3	4	1	14.3	26	8	11.0	101	9	14.4	
										Cotton						
IMF	14	5	3.8	30	11	1.9	21	7	3.2	41	13	2.6	106	9	2.7	
IMO	63	22	3.3	85	31	1.5	94	30	3.3	62	20	2.1	304	26	2.5	
IOF	25	8	3.1	29	10	1.8	44	14	3.5	59	19	2.2	157	13	2.6	
IOO	158	54	3.0	111	40	1.4	153	48	2.9	117	38	1.9	539	45	2.4	
Total	260	89	3.2	255	92	1.5	312	99	3.1	279	90	2.1	1106	93	2.5	
OMF	0	—	—	4	2	*	—	—	—	—	1	1	2.5	5	†	1.4
OMO	4	1	*	3	1	*	—	1	†	—	4	1	2.4	12	1	1.8
OOF	2	25	9	1.6	11	4	1.1	1	†	†	4	1	1.4	10	1	1.5
OOO											21	7	1.1	58	5	1.4
Total	31	11	1.5	21	8	1.1	3	1	3.5	30	10	1.4	85	7	1.4	

\* Average yield is not given since the observations are less than 5

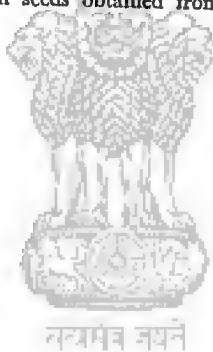
- Average yield is not given since the data indicates that Percentage is less than 0.5.

## ANNEXURE 15.9

*Percentage distribution of fields sampled and average yield in quintals per hectare, according to source of seed used in Ludhiana district (Punjab)*

Crop	Source of seed	1962-63		1963-64		1964-65	
		Per- centage to the total	Av. yield	Per- centage to the total	Av. yield	Per- centage to the total	Av. yield
Wheat	Own	23	20.2	54	21.2	57	24.0
	Cooperative Societies/ Govt.	25	20.3	27	23.7	22	23.2
	Others	52	17.7	19	21.7	21	22.7

*Note:—* For other crops the table is not presented since the number of fields reported to be sown with seeds obtained from Government or cooperatives is very small.



## CHAPTER XVI

### PALI (RAJASTHAN)

#### I

##### *Coverage*

16.1 The IADP was launched in parts of 7 out of 10 blocks in Pali district during kharif 1961-62 and was extended to the remaining 3 blocks during the following year, thus covering the entire district. Out of 866 villages in the district, 274 villages were covered during 1961-62 and 680 villages in 1963-64. During the year 1964-65, the programme was shifted from the low potential and drought affected blocks of Pali district to four blocks of the neighbouring district of Sirohi. The coverage of the programme during 1964-65 thus comprised of six blocks of Pali and 4 blocks of Sirohi. Coverage in terms of gross cropped area brought under the programme in these blocks increased from 0.19 lakh hectares in 1961-62 to 0.83 lakh hectares in 1963-64 and to 1.21 lakh hectares in 1964-65. A farm plan is prepared for every farmer participating in the programme. The number of such plans prepared during 1961-62 was 7,100. It increased to 26,115 during 1963-64 and to 46,691 during 1964-65.

##### *Demonstrations*

16.2 The composite demonstrations laid out since the inception of the programme are as under :—

Year	Kharif	Rabi	Total
1961-62	116	190	306
1962-63	439	511	950
1963-64	336	343	679
1964-65	267	307	574

The number of demonstrations of wheat growing during the rabi 1961-62 was 131; this increased to 221 during the rabi 1962-63 and to 222 during 1963-64. Such demonstrations during 1964-65 were only 175. A number of demonstrations planned in early years did not quite succeed due to wrong selection of sites or inadequate follow-up by the extension staff. This was, however, corrected in later years. The unfavourable

weather and inadequate irrigation were also responsible for failure of a number of demonstrations. However, in successful demonstrations, the average yields obtained were significantly higher than those obtained from control plots. During 1964-65, as against a target of 920 demonstrations, both for the kharif and rabi seasons, altogether 574 demonstrations were actually laid on farmers' fields. These demonstrations have shown a return of Rs. 1.50 to Rs. 3.20 for each additional rupee spent on the recommended improved practices. Besides the composite crop demonstrations, a number of fertilizer and other method demonstrations were also arranged during these years.

#### *Fertilizers*

16.3 Prior to the introduction of the programme, the fertilizer offtake in the district was meagre. The following table shows the subsequent improvement in the level of fertilizer offtake in the district:—

Year	Nitrogenous (in terms of Ammonium sulphate)	Phosphatic (in terms of Super phosphate)	(Tonnes)
1960-61	234	64	
1961-62	1150	637	
1962-63	1400	449	
1963-64	1012	275	
1964-65	3101	1165	

The low offtake of fertilizers during 1963-64 was due to scanty rainfall in that year. During 1964-65, the position improved considerably and the offtake of both nitrogenous and phosphatic fertilizers reached a level of 3101 tonnes and 1165 tonnes respectively as compared to the pre-package level of 234 tonnes and 64 tonnes respectively. In Pali district the fertilizers are supplied by the Agriculture Department to the *Panchayat Samities* who distribute them either through the cooperative societies or the *Panchayats* on credit. The *Panchayat Samities* have been advised to appoint private dealers in such villages as are not covered by service cooperative societies or where *Panchayats* do not undertake distribution work.

#### *Improved Seeds*

16.4 Agricultural Department has set up seed multiplication farms where seeds of the recommended varieties of crops are multiplied. These

seeds are further multiplied by registered-seed growers under the supervision of the Department and *Panchayat Samities* and then procured from them for further distribution to the cultivators. There were 3 seed farms in the district in 1961-62. However, supply of improved seeds of staple crops had to be made available from outside the district to meet the demand of Pali. Subsequently a new seed farm was established in the Jawai Command area at Sumerpur in 1963-64 and it is expected that this farm would meet the demand for foundation-stock seeds of the district. The quantity of the improved seeds distributed during 1961-62 was 1700 tonnes. This, however, decreased to 1033 tonnes in 1962-63 and 658 tonnes in 1963-64. Area covered by improved seeds in the district also showed a decline from 0.17 lakh hectares in 1961-62 to 0.16 lakh hectares in 1962-63 and to 0.07 lakh hectares in 1963-64. This decline is attributed to the scanty rainfall since 1962-63 which did not enable procurement of the required quantity of seeds. However, during 1964-65, both the quantity of seeds distributed and the area covered by improved seeds increased to 2208 tonnes and 0.25 lakh hectares respectively.

#### *Plant Protection*

16.5 In Pali district, the desert locust was the major problem to be tackled under the plant protection programme during the first two years. Pesticides are procured by the Agriculture Department and supplied on credit to the *Panchayat Samities* which sell them to farmers on cash basis through cooperatives or field staff.

16.6 During the first two years of the programme, a comparatively wider area of 20,074 hectares in 1961-62 and 65,270 hectares in 1962-63 was covered by plant protection measures in the district against locust invasion. The coverage during 1963-64 and 1964-65 was only 6380 hectares and 14,622 hectares respectively, as there was no locust in these years. Pesticide formulations used for plant protection work aggregated 215 tonnes in 1961-62, 74 and 29 tonnes respectively in the next 2 years and 103 tonnes in 1964-65. Besides, prophylactic treatment of seeds was also attempted on an extensive scale. The quantity of seeds subjected to such treatment increased from 254 tonnes in 1961-62 to 661 tonnes in 1962-63, 737 tonnes in 1963-64 and 1105 tonnes in 1964-65. Other plant protection measures like weed control with 2-4D weedicide, control of pests in chillies, barley and cotton and control of powdery mildew in cumin (*zeera*) have also become popular with the farmers.

#### *Agricultural Implements*

16.7 The agricultural implement workshop has been completed and commissioned in early 1964. The workshop undertakes repair of all types of agricultural implements. Fitters of the workshop are also sent

to the *Panchayat Samitis* for checking and repairing implements maintained at these centres. Production of proto-type agricultural implements to suit local conditions has also been taken up at the workshop. One fertilizer-cum-seed drill having iron body was made in the workshop and was put to intensive trials. Certain modifications to these implements to suit local conditions, which have become evident during the trials, are now being effected. Besides, teams of expert demonstrators are sent from village to village to demonstrate the use of appropriate implements at the correct time. The parties also repair implements of the cultivators collected at the *Gramsevaks'* headquarters. This practice has created some demand from cultivators for improved implements. During 1963-64 and 1964-65, about 7,021 improved implements were distributed.

#### *Soil Testing*

16.8 The existing soil testing laboratory at Jodhpur has been strengthened and additional staff provided to meet the requirements of the district. During the three years 1962-63, 1963-64 and 1964-65, 1,884, 3,884 and 3,763 soils samples respectively were tested and 1,884, 3,884 and 1,455 recommendations respectively were made on the basis of these tests.

#### *Cooperative Credit, Marketing & Processing*

16.9 When the programme was introduced in kharif 1961-62, there were 421 cooperative credit societies in the district. Their number increased to 444 in 1963-64 and now stands at 449. They cover about 98 per cent of villages and 48 per cent of the agricultural population in the district. The membership of these societies has increased from 0.30 lakh in 1960-61 to 0.45 lakh in 1963-64 and then dropped to 0.43 lakh in 1964-65. The share capital of these societies increased steadily from Rs. 8.30 lakhs in 1960-61 to Rs. 14.17 lakhs in 1963-64 and further to Rs. 15.07 lakhs in 1964-65. The amount of loans advanced by the cooperatives was of the order of Rs. 30.57 lakhs in 1960-61, Rs. 3.72 lakhs in 1963-64, and Rs. 16.72 lakhs in 1964-65. The decline in loans advanced was due to successive droughts in these years. The amount of loan recovered during 1962-63 and 1963-64 was Rs. 29.74 lakhs and Rs. 4.91 lakhs respectively and the overdues in these years were over 70 per cent. The high percentage of over-dues was due to crop failure over large areas in the district because of erratic rainfall and inadequate irrigation on account of which the cultivators were not able to repay the loans.

16.10 There are seven marketing societies in the district, as against 5 during the pre-package period. During 1964-65, these societies handled agricultural commodities worth Rs. 4.96 lakhs on commission basis and Rs. 3.66 lakhs on outright purchase basis as against Rs. 4.46 lakhs worth handled as agents and Rs. 1.06 lakhs on their own during the preceding

year. The linking of credit with marketing during 1964-65 was very little, as the total amount recovered by these societies was negligible.

#### *Storage Godowns*

16.11 As against 107 godowns needed to saturate the district, there were 86 godowns owned by cooperatives by the end of June, 1965. Another 21 godowns were under construction. During the year 1964-65, 14 godowns were added to the number existing in June, 1964.

## II

#### *Results of agronomic and agro-economic surveys 1961-64*

16.12 The agronomic and agro-economic survey was started in the year 1961-62 in the district and its control areas and since then it is being repeated annually. The control areas selected are Pindwara in Sirohi district, Bilara and Luni in Jodhpur district and Jalore in Jalore district. Each year about 850 cultivators' holdings were randomly selected for enquiry (at the rate of 8 cultivators' holdings per village).

#### *Holding size*

16.13 The results of the survey indicated that in the district, about 17 per cent of the cultivators' holdings were small (less than 2 hectares in size) while 64 per cent were large (above 4 hectares) and the remaining were of medium size (2 to 4 hectares). It was observed that 38 per cent of the farmers were cultivating land more than 8 hectares. Large holdings of over 8 hectares accounted for about two-thirds of the total cultivated area in the district (69 per cent) and another one-fifth was accounted for by large holdings of size 4 to 8 hectares. The share of the medium size holdings was of the order of 8 per cent and that of small sized ones only 3 per cent. The proportion of cultivators' holdings sampled from the control areas falling in the various size classes was also more or less of the same order.

16.14 Annexure 16.1 gives the cropping pattern followed by the cultivators in the various size groups of holdings in the district. Foodgrains account for about 65 per cent of the gross cropped area. Bajra, jowar, and wheat are the chief foodgrain crops raised. *Til* (*Sesamum*) is the chief commercial crop grown in the district and its share in the gross cropped area is about 20 per cent. The proportion of area under foodgrain crops in the district decreased from 72 per cent in 1961-62 to 62 per cent in 1963-64. This was probably due to diversion of part of the area under foodgrain crops to other crops like rape and mustard. The farmers of various size categories devoted the same proportion of area of their holdings to the cultivation of foodgrain crops. The area under fodder crop appears to have increased during the period.

*Distribution of production supplies*

16.15 Improved seeds of maize, wheat and barley, chemical fertilizers like ammonium sulphate, super phosphate and plant protection chemicals were the chief items of production supplies distributed to the cultivators. From the results, it appears that the programme of the distribution of production supplies has not made satisfactory progress in the year 1961-62. Improved seeds of wheat had reached only 4 per cent of the farmers in the district. This proportion rose to 24 per cent in 1963-64. Bulk of the farmers were using local seeds. In case of chemical fertilizer, the distribution position was still worse. Even in 1963-64, less than 10 per cent of the cultivators availed of the supplies of chemical fertilizer. Supplies of pesticides, weedicides etc. and improved implements were also limited to less than 3 per cent of the cultivators in different years.

*Distribution of credit*

16.16 The loan obtained in the year 1962-63 by a cultivator from all sources was of the order of Rs. 189 and it decreased to Rs. 159 in the year 1963-64 (Annexure 16.2). Government and cooperatives met about 27 per cent of the total credit taken during 1962-63 but this share was reduced to about 14 per cent in the year 1963-64.

16.17 A study of the relationship between loans taken and the size of cultivators' holdings indicated that the amount of loan taken generally increased with the holding-size. In the year 1963-64, the cultivators having small and medium size holdings respectively took, on an average, a loan of Rs. 110 and Rs. 82. The amount increased to Rs. 145 for the holding of size 4 to 8 hectares and to Rs. 246 for the holdings of size above 8 hectares. The average amount of loan per hectare, however, decreased with increase in the holding size in both the years.

*Use of manures and fertilizers*

16.18 Percentage of the cultivators using chemical fertilizers was less than 10 per cent in all the years. The use of green manure was completely absent. In the absence of assured and adequate irrigation facilities, fertilizer use had not gained momentum in the district.

*Cropwise consumption of fertilizers and manures*

16.19 The consumption of fertilizer continued to be small in the district. The nitrogenous fertilizer distributed during 1961-62 was 1150 tonnes. While it increased to 1400 tonnes in the year 1962-63, it decreased in 1963-64 to 1012 tonnes. The fertilizer was applied mostly to foodgrain crops, namely, maize, wheat and barley. The proportionate share of these three crops were 28 per cent, 23 per cent and 16 per cent respectively while cash crops like chillies, cotton and oilseeds together consumed 25 per cent only (Annexure 16.3).

16.20 The distribution of phosphatic fertilizers decreased to 275 tonnes in 1963-64 as against 637 tonnes in 1961-62. The proportion of this fertilizer consumed mostly by foodgrain crops, namely, maize, wheat and barley, was of the order of 40 per cent, 13 per cent and 13 per cent respectively. Cash crops together consumed about 30 per cent of the total distributed quantity.

16.21 The total quantity of farmyard manure produced in the district was estimated at 7 lakh tonnes per annum. About one-third of this quantity was applied to wheat crop, another one-third to the kharif cereals, namely, maize, bajra and jowar and one-fifth of the total to the remaining foodgrain crops. The share of the commercial crops in the total quantity of farmyard manure consumed was of the order of 15 per cent, on an average.

#### *Percentage area benefited and average rate of application*

16.22 The percentage area under different crops receiving fertilizer application revealed that the area benefited continued to be small for nitrogenous fertilizer. There was a slight increase in the area benefited under oilseed crops while no such trend was observed for foodgrain crops. The rate of application of this fertilizer also decreased for wheat crop from 139 kg. in 1961-62 to 78 kg. per hectare in 1963-64 (Annexure 16.4) and for barley crop from 120 kg. to 98 kg. per hectare during the same period. The use of fertilizers was also observed for cash crops like chillies and rape and mustard during the period.

16.23 Since the use of chemical fertilizer was confined to only a small percentage of cultivators, there was a good deal of variation in the average rate of application from year to year. The use of chemical fertilizers which are the most important input items for increasing crop production was confined to limited area. In the district, the rate of application was much below the recommended rate (less than 50 per cent). Assuming that entire irrigated area under wheat needs fertilizer application at the recommended rate, only less than 7 per cent of the potential requirement of fertilizer for this crop was met in the year 1964-65.

### III

#### *Results of crop-cutting surveys conducted during 1961-65*

16.24 Crop-cutting surveys are being conducted in Pali district and the control area on maize, jowar and bajra during kharif season and on wheat, barley and wheat-barley mixture during rabi season. The area under these crops in the district was 60 per cent of the gross cropped area. The results based on crop cuts are presented in Annexures 16.5 to 16.9.

16.25 It may be seen from Annexure 16.5 that there is a wide variation in the yield rate of different crops from year to year. The variation in the yield rate of kharif crops is of much higher order compared to the rabi crops. The annual changes in the yield rate are to be ascribed largely to the fluctuations in the rainfall and its distribution over different periods in the year. The district is having only limited irrigation facilities and even their source depends to a considerable extent on the rainfall.

16.26 There was a slight increase in the yield rate of maize and wheat during the four-year period under report over 1958-61. But no trend in the yield or in the production (Annexure 16.6) was observed during the operation of the IADP. No trend was noticeable after adjustment for seasonal effects and normal development activities with the help of data for comparable areas.

#### *Participants vs. non-participants*

16.27 Results relating to the proportion of fields of participant cultivators and yield rates obtained by them are presented in Annexure 16.7. The proportion of participant cultivators for all the crops showed a steady increase from year to year but even during the year 1964-65, it was less than 30 per cent for all crops.

16.28 Yield rates in the fields of participant cultivators were generally higher than those in the fields of non-participant cultivators. The difference in the yield rates between the two groups were of a smaller order during the year 1964-65 compared to the earlier years. In the year 1964-65, it varied from 0.1 quintal per hectare for bajra to 1.8 quintals per hectare for barley crop.

#### *Combination of agronomic practices with yield rates*

16.29 Bajra and jowar crops, accounting for bulk of the cropped area during the kharif season, are grown mostly in rainfed conditions. Maize is the only important kharif crop receiving some irrigation facilities. Most of the area under wheat and barley, the important foodgrain crops grown during the rabi season, however, enjoy irrigation facilities. It can be seen from Annexure 16.8 that in the case of maize crop, fields enjoying irrigation facilities yielded on an average about 1.5 quintals per hectare more than the unirrigated fields under the same crop.

16.30 Yield rates of fields receiving fertilizers under wheat, barley and maize crops were higher than those not receiving fertilizer. The difference varied between 2 to 3 quintals per hectare for different crops. As has been mentioned earlier, fertilizers were applied to bajra and jowar crops grown in the district only to a negligible extent.

16.31 The use of improved seeds was limited to maize and wheat crops only. There was a steady increase in the use of improved seeds for

both the crops. The proportion of wheat fields under improved seeds increased from 12 per cent in 1962-63 to 17 per cent in 1964-65. N.P.-718 was the most popular improved wheat strain and fields under this variety gave higher yields ranging up to 3 quintals per hectare over the local varieties.

16.32 It may be seen from Annexure 16.9 that the performance of improved seeds obtained from the cooperative or government was superior as compared to those obtained locally, for most of the crops in all the years.



## ANNEXURE 16.1

*Percentage area under different crops for different holding size groups in Pali*

Crop	Small size holding (upto 2 hectares)	Medium size holding (2 to 4 hectares)	Large size holding		Pooled over all holdings
	1	2	3	4	
Maize	9	5	4	2	2
Bajra	14	15	15	18	17
Jowar	18	17	18	18	18
Wheat	10	12	16	16	16
Barley	6	6	6	3	4
Wheat+Barley	4	4	4	3	3
Other foodgrains	7	7	5	4	5
Total foodgrains	68	66	68	64	65
Oilseeds	18	17	18	22	20
Cotton	2	4	2	1	2
Chillies	1	1	2	1	1
Fodder crops	6	8	7	8	8
Other crops	5	4	3	4	4
Total all crops	100	100	100	100	100

ANNEXURE 16.2

*Average amount of loan borrowed per cultivator from different agencies in Pali district during the years 1962-63 and 1963-64*

Agency	Average amount (Rs.) borrowed per sampled cultivator									
	1962-63					1963-64				
	Small holding (less than 2 hectares)	Medium holding (2-4 hectares)	Large holding (4-8 hectares)	Pooled		Small holding (less than 2 hectares)	Medium holding (2-4 hectares)	Large holding (4-8 hectares)	Pooled	
1	2	3	4	5	6	7	8	9	10	11
Govt or Cooperative	7.86	45.45	52.07	73.01	51.44	—	0.23	7.80	58.77	21.89
{ For agricultural purposes	18.00	24.64	61.54	97.72	60.79	70.58	41.56	88.24	130.62	89.14
Others { For non-agricultural purposes	44.58	28.06	76.66	115.91	76.66	39.59	40.27	48.88	56.21	47.94
Total	62.58	52.70	138.20	213.63	137.45	110.17	81.83	137.12	186.83	137.08
Per cultivator	70.44	98.15	190.27	286.64	188.89	110.17	82.15	144.92	245.60	158.97
Pooled over all agencies	64.04	31.48	32.81	18.84	23.03	100.15	26.50	24.56	17.80	22.08
Number of sampled cultivators	84	102	108	195	439	83	119	152	177	531

**ANNEEXURE 16.3**  
*Percentage cropwise consumption of different organic manures and chemical fertilizers in Pali district*

Name of crop	F.Y.M. or Compost				Nitrogenous fertilizers (as A.S or equivalent)				Phosphatic fertilizers (as S.P. or equivalent)			
	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64
1	2	3	4	5	6	7	8	9	10	—	—	—
Maize	10	20	15	—	23	28	—	30	40	—	—	—
Bajra	14	22	7	—	6	—	—	—	—	—	—	—
Jowar	6	3	4	—	4	*	—	—	1	—	—	—
Wheat	33	23	33	—	36	23	—	42	13	—	—	—
Barley	10	7	21	—	12	16	—	3	13	—	—	—
Wheat + Barley	9	8	8	—	5	5	—	—	—	—	—	—
Other foodgrains	*	*	*	—	*	*	—	*	*	—	*	*
Total foodgrains	82	83	88	—	86	72	—	75	67	—	—	—
Oilseeds	3	5	2	—	4	8	—	7	3	—	—	—
Cotton	4	3	5	—	3	2	—	3	6	—	—	—
Chillies	3	3	3	—	4	15	—	11	21	—	—	—
Other crops	8	6	2	—	2	3	—	4	3	—	—	—
Total quantity consumed/distributed (Tonnes)	N.A.	710600	652500	1150	1400	1012	637	449	275	—	—	—

\* Percentage to the total less than 0.5.

Note:— Data relating to consumption of nitrogenous and phosphatic fertilizers in 1961-62 were incomplete.

ANNEXURE 16.4  
*Percentage area under various crops benefited by different manures and fertilizers and their average rates of application in Pali district and its control area*

Type of area	Kind of organic manure or chemical fertilizer	Maize						Wheat					
		Percentage area benefited	Average rate of application (Q./H)	Percentage area benefited	Average rate of application (Q./H)	Percentage area benefited	Average rate of application (Q./H)	Percentage area benefited	Average rate of application (Q./H)	Percentage area benefited	Average rate of application (Q./H)	Percentage area benefited	Average rate of application (Q./H)
		1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64	1961-62	1962-63	1963-64
IADP District	F.Y.M. or Compost	62	62	45	160.00	83.00	85.00	74	49	65	145.00	65.00	69.00
	Nitrogenous fertilizer†	0	4	—	—	1.49	1.06	1	5	3	1.39	1.01	0.78
	Phosphatic fertilizer ‡	0	3	1	—	0.95	2.31	1	3	*	1.02	0.71	1.36
Control area	F.Y.M. or Compost	85	66	48	131.00	82.00	125.00	58	50	47	133.00	75.00	75.00
	Nitrogenous fertilizer†	0	3	3	—	0.94	**	*	0	2	—	—	0.60
	Phosphatic fertilizer ‡	0	0	2	—	—	1.25	0	0	0	—	—	—

\* Percentage less than 0.5.

\*\* Rate of application has not been presented as only a single sampled cultivator applied the fertilizer.

† Ammonium sulphate ore equivalent.

‡ Super phosphate or equivalent.

Note:— Results for 1961-62 are based on partial data.

**ANNEXURE 16.5**  
*Average yield in quintals per hectare in Pali district and comparable areas*

Crop	Year	Pali district		Control area		Rajasthan State excluding Pali district		Rajasthan State including Pali		Adjusted yield of Pali district utilising the data relating to adjoining districts*	
		Average yield	S.E.	Average yield	S.E.	Control area	Adjoining districts*	Control area	Adjoining Rajasthan districts*	State excluding Pali district	Adjoining Rajasthan districts*
1	2	3	4	5	6	7	8	9	10	11	
<b>Maize</b>	Average for 3 years 1958-61	7.6	—	—	—	10.5	9.4	—	—	—	—
	1961-62	9.7	0.52	7.9	0.96	11.4	10.4	9.8	9.8	9.7	9.7
	1962-63	9.1	0.39	10.5	0.97	11.7	11.0	9.1	9.0	8.7	8.7
	1963-64	6.6	0.38	10.8	0.94	11.5	9.2	6.6	6.6	7.5	7.5
	1964-65	7.8	0.36	11.8	1.06	11.6	11.1	7.9	7.9	7.4	7.4
	Average for 4 years 1961-65	8.3	0.20	10.3	0.50	11.6	10.4	—	—	—	—
	Average for 3 years 1958-61	2.0	—	—	—	1.8	2.1	—	—	—	—
<b>Bajra</b>	1961-62	3.2	0.18	2.7	0.24	1.7	2.4	3.2	3.3	2.9	2.9
	1962-63	2.5	0.17	2.5	0.44	2.0	2.3	2.5	2.4	2.2	2.2
	1963-64	1.3	0.12	1.6	0.14	1.4	0.7	1.3	1.6	2.2	2.2
	1964-65	3.2	0.19	3.1	0.32	2.5	2.6	3.5	3.1	3.1	3.1
	Average for 4 years 1961-65	2.6	0.08	2.5	0.15	1.9	2.0	—	—	—	—

ANNEXURE 16.5 (*Contd.*)

	1	2	3	4	5	6	7	8	9	10	11
<b>Average for 3 years</b>											
	1958-61	1.5	—	—	—	1.3	3.1	—	—	—	—
Jowar	1961-62	2.8	0.21	2.8	0.49	1.5	2.5	2.8	2.7	2.7	3.3
	1962-63	1.3	0.13	1.2	0.27	2.5	3.8	1.3	0.6	0.6	0.9
	1963-64	0.5	0.08	0.2	0.13	0.4	2.8	0.5	1.2	1.2	0.8
	1964-65	1.3	0.12	1.9	0.44	1.3	3.6	1.6	1.7	1.7	1.3
<b>Average for 4 years</b>											
	1961-65	1.5	0.06	1.5	0.15	1.4	3.2	—	—	—	—
<b>Average for 3 years</b>											
	1958-61	8.7	—	—	—	9.1	8.9	—	—	—	—
Wheat	1961-62	10.4	0.26	12.4	0.67	11.8	9.8	10.0	9.6	9.6	9.3
	1962-63	9.4	0.29	12.8	0.85	7.6	6.8	8.9	10.3	10.3	10.5
	1963-64	8.1	0.25	8.8	0.82	9.7	7.7	9.0	8.2	8.2	8.6
	1964-65	10.2	0.25	11.1	0.82	10.6	9.1	10.6	10.3	10.3	10.1
<b>Average for 4 years</b>											
	1961-65	9.5	0.13	11.3	0.41	9.9	8.4	—	—	—	—
<b>Average for 3 years</b>											
	1958-61	9.4	—	—	—	12.6	11.6	—	—	—	—
Barley	1961-62	11.8	0.30	14.9	1.67	12.3	12.1	10.7	11.7	11.7	11.2
	1962-63	10.8	0.31	11.2	1.01	11.4	11.0	11.0	11.0	11.0	11.0
	1963-64	9.7	0.27	7.6	1.26	11.7	10.6	11.1	9.8	9.8	10.2
	1964-65	11.5	0.35	13.0	0.66	12.4	11.4	11.3	11.6	11.6	11.7
<b>Average for 4 years</b>											
	1961-65	11.0	0.15	11.7	0.63	12.0	11.3	—	—	—	—

\*Ajmer, Nagaur, Jodhpur, Jalore, Sirohi and Udaipur

## ANNEXURE 16.6

*Estimated total production in '00 tonnes in Pali district*

Year	Crop					Value of total pro- duction* (Rs. in lakhs)
	Maize	Bajra	Jowar	Wheat	Barley	
1	2	3	4	5	6	7
<b>Average for 3 years</b>						
1958-61	179	195	203	540	288	549
1961-62	247	362	382	875	397	888
1962-63	251	226	150	563	314	585
1963-64	166	121	43	388	262	383
1964-65	200	415	164	641	306	679
<b>Average for 4 years</b>						
1961-65	214	281	185	617	320	634
Percentage increase or decrease in the average production for the years 1961-65 over the average for the years 1958-61						
	+19.6	+44.1	-7.9	+14.2	+11.1	
Percentage increase or decrease in the average State production for the years 1961-65 over the average for the years 1958-61						
	+25.7	+55.4	+9.6	-5.6	-12.3	

\* Value of total production was worked out on the basis of the State harvest prices in the year 1960-61.

## ANNEXURE 16.7

*Yield rates of different crops separately for participant and non-participant cultivators in Pali district*

Crop	Year	Percentage of participant cultivators	Average yield (Q/H)	
			Participants	Non-participants
1	2	3	4	5
Maize	1962-63	20	10.7	8.7
	1963-64	22	6.9	5.9
	1964-65	27	8.5	7.0
Bajra	1962-63	9	4.5	2.7
	1963-64	16	1.7	1.5
	1964-65	18	3.3	3.4
Jowar	1962-63	8	1.2	1.7
	1963-64	14	0.2	0.5
	1964-65	21	1.2	1.4
Wheat	1962-63	13	13.8	8.8
	1963-64	16	10.2	7.6
	1964-65	32	11.4	10.3
Barley	1962-63	12	12.3	10.5
	1963-64	19	12.9	9.4
	1964-65	25	13.3	11.5

*Note :—Definition of the participant cultivator followed in 1961-62 was not the same as the one adopted during the subsequent years. Hence the results for 1961-62 are not presented.*

ANNEXURE 16.8

*Percentage distribution of fields sampled in Pali district for different combinations of practices—Irrigation (I), Manure (M) and Fertilizer (F) and their average yields in quintals per hectare.*

Crop/ Practices followed	1961-62				1962-63				1963-64				1964-65				Pooled over all the years			
	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16					
MONITORING	24	14	11.5	22	9	11.2	4	*	*	7	3	6.7	5.7	6	11.0					
MONITORING	48	28	11.2	104	44	10.3	105	44	6.6	77	30	7.3	334	37	8.6					
MONITORING	2	1	*	2	1	*	3	1	*	3	1	*	10	1	12.2					
MONITORING	18	10	7.2	41	17	9.2	39	16	5.4	42	17	7.6	140	16	7.4					
Total	92	53	10.5	169	71	10.2	151	63	6.6	129	51	7.4	541	60	8.6					
MONITORING	12	7	9.8	4	2	*	*	—	—	—	2	1	*	18	2	9.8				
MONITORING	48	28	8.4	37	16	6.5	49	21	6.6	76	30	8.1	210	23	7.5					
MONITORING	5	3	*	—	—	—	—	—	—	—	2	1	*	7	1	11.2				
MONITORING	16	9	7.9	27	11	5.6	38	16	3.9	43	17	6.4	124	14	5.7					
Total	81	47	8.9	68	29	6.2	87	37	5.4	123	49	7.5	359	40	7.1					
Bajra																				
MONITORING	3	2	*	3	1	*	1	+	*	—	—	—	—	—	7	1	3.9			
MONITORING	24	14	4.6	28	13	3.0	36	14	2.1	33	14	3.7	121	13	3.2					
MONITORING	2	1	*	—	—	—	1	+	*	3	1	*	6	1	4.4					
MONITORING	145	83	2.9	185	86	2.8	225	86	1.4	209	85	3.2	764	85	2.5					
Total	174	100	3.1	216	100	2.8	263	100	1.5	245	100	3.5	898	100	2.6					

## ANNEXURE 16.8 (Continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Jowar</b>																
O M F	1	1	*	—	—	—	—	—	—	—	—	—	—	1	+	*
O M O	17	13	4.7	25	10	2.1	21	9	1.4	11	5	2.0	74	9	2.5	
O O F	4	3	*	—	—	—	—	—	—	1	+	*	5	+	1.6	
O O O	111	83	2.8	229	90	1.4	206	91	0.4	232	95	1.3	778	91	1.3	
Total	133	100	3.0	254	100	1.5	227	100	0.5	244	100	1.3	858	100	1.4	
<b>Wheat</b>																
I M F	12	5	13.0	10	4	15.6	3	1	*	18	7	9.5	43	4	12.1	
I M O	132	52	10.8	115	47	10.4	112	44	8.5	114	44	10.7	473	47	10.1	
I O F	7	3	10.5	8	3	14.6	14	5	12.2	14	5	12.1	43	4	12.3	
I O O	101	40	10.5	111	46	7.7	128	50	7.1	113	44	10.6	453	45	8.9	
Total	252	100	10.8	244	100	9.5	257	100	8.1	259	100	10.6	1012	100	9.7	
<b>Barley</b>																
I M F	8	4	12.8	9	4	12.4	,	12	5	11.2	14	6	15.8	43	5	13.2
I M O	134	61	12.0	135	58	11.6	173	72	10.6	134	54	11.6	576	61	11.4	
I O F	4	2	*	4	2	*	7	3	11.9	14	6	16.0	29	3	14.2	
I O O	71	33	11.5	83	36	9.2	49	20	8.2	84	34	11.3	287	31	10.2	
Total	217	100	11.9	231	100	10.8	241	100	10.2	246	100	12.0	935	100	11.2	

\* Average yield has not been given since the observations are few

◆ Percentage to the total less than 0.5

## ANNEXURE 16.9

*Percentage distribution of fields sampled in Pali district according to source of seed used and average yield in quintals per hectare for each source*

Source of seed	1962-63			1963-64			1964-65			Pooled over all years			
	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield	
1	2	3	4	5	6	7	8	9	10	11	12	13	
<b>Maize</b>													
Own source	184	79	9.0	200	85	6.4	212	84	7.5	596	83	7.6	
Cooperative societies	15	6	10.9	14	6	4.0	10	4	7.2	39	5	7.5	
Government	—	—	—	5	2	13.3	6	2	9.3	11	2	11.1	
Others	34	15	7.8	16	7	3.4	24	10	6.0	74	10	6.3	
<b>Bajra</b>													
Own source	177	83	2.9	234	87	1.5	188	76	3.7	599	82	2.6	
Cooperative societies	4	2	†	12	5	1.8	4	1	†	20	3	2.7	
Government	—	—	—	1	*	†	7	3	1.8	8	1	1.8	
Others	32	15	2.3	21	8	1.9	49	20	2.1	102	14	2.1	

ANNEXURE 16.9 (*Continued*)

	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Jowar</b>													
Own source	183	77	1.6	202	85	0.5	173	68	1.6	558	77	1.2	
Cooperative societies	10	4	0.9	16	7	0.4	16	6	0.9	42	6	0.7	
Government	—	—	—	—	—	—	11	5	0.5	11	1	0.5	
Others	44	19	1.5	20	8	0	53	21	1.0	117	16	1.0	
<b>Wheat</b>													
Own source	212	84	8.9	224	86	8.0	159	73	10.4	595	82	9.0	
Cooperative societies	15	6	16.1	10	4	10.2	19	9	10.7	44	6	12.4	
Government	—	—	—	4	2	†	13	6	13.3	17	2	13.3	
Others	25	10	10.0	22	8	7.1	27	12	10.7	74	10	9.4	
<b>Barley</b>													
Own source	200	86	10.8	214	88	9.8	197	79	12.2	611	84	10.9	
Cooperative societies	10	4	9.7	8	3	14.7	14	6	10.0	32	4	11.1	
Government	—	—	—	4	2	†	15	6	11.7	19	3	12.6	
Others	22	10	10.5	18	7	9.4	24	9	10.4	64	9	10.2	

† Average yield has not been given since the observations are less than 5.

\* Percentage less than 0.5.

## CHAPTER XVII

### ALLEPPEY AND PALGHAT (KERALA)

As districts in Kerala are very small in size, on the suggestion of the State Government, two districts, namely, Alleppey and Palghat were selected for the IAD Programme in the State.

#### A : ALLEPPEY

##### I

17.1 Alleppey is a coastal district of Kerala State having a geographical area of about 1.87 thousand square kilometres. It comprises of 7 taluks, 99 panchayats and spreads over 17 community development blocks. The population in the year 1961 was 18.11 lakhs, about 83 per cent of which was rural. The density of population is 967 per square kilometre. There are 1.64 lakhs cultivating families in the district. The district is served by 1398 kilometres of roads, including 587 kilometres of village roads and 49 kilometres of railway lines. The average annual rainfall is 332 cms. and is received mostly during the period June to October. Soil types are sandy, alluvial, peaty, laterite, loam and clay.

##### *Land Utilisation*

17.2 Before the inception of the package programme, the net area sown was of the order of 1.58 lakh hectares or about 85 per cent of the geographical area. About 40 per cent of the net area sown was double cropped making the gross cropped area 2.21 lakh hectares. The main sources of irrigation are lift irrigation from rivers, canals and tanks. The land utilisation data for the district for three years ending 1961-62 are given in Annexure 17.1

##### *Cropping Pattern*

17.3 Paddy, the main crop of the district, accounted for 35 per cent of the gross cropped area. Among commercial crops, coconut covered 23 per cent, tapioca 10 per cent, sugarcane 3 per cent and sesamum 3 per cent. During the three years preceding the introduction of the IADP, the average out-put of paddy in the district was of the order of 1.09 lakh tonnes, while production of sugarcane averaged 0.22 lakh tonnes. Annexure 17.2 shows the area, production and yield per hectare of foodgrains and major commercial crops.

##### *Land Tenure*

17.4 The lands in the district have been settled on the *ryotwari* principle of direct settlement with *ryots*. The system of land tenure

comprises of tenancy with permanent occupancy rights and classes of favourably assessed lands which include government and private lands held on lease. The holders of tenancy with permanent occupancy rights have absolute ownership with right of alienation and inheritance. The holders of lease-lands have also, for all purposes, alienable and inheritable rights. By the *Travancore-Cochin Edavagai Rights Acquisition Act of 1955*, the free-hold estates were acquired by the Government by payment of compensation to tenants. With a view to conferring full proprietary rights on the holders of favourably assessed lands in the Cochin area, the *Kanom Tenancy Act of 1955* was passed and has come into effect from 1st March, 1956. In the case of all lands in the Cochin area, over and above the assessment fixed at the settlement, a rent of 3 paise in the rupee is fixed as due to the State.

#### *Administrative Arrangements*

17.5 The District Collector, Alleppey is in overall charge of the programme which is implemented by the Joint Director of Agriculture. At the district level, the Joint Director of Agriculture is assisted by Subject-matter Specialists in Farm Management, Plant Protection, Agronomy and Soil Science. The other personnel consists of Deputy Registrar and Assistant Registrar of Cooperative Societies, District Agricultural Officer, Additional District Information Officer, Assistant Agricultural Engineer, Assistant Project Officer and Assistant Director of Statistics.

17.6 At the block level, the additional staff consists of 2 Agricultural Extension Officers, one Cooperative Extension Officer and 10 Village Level Workers. As on June 1965 almost all the additional staff sanctioned was in position except one Agricultural Extension Officer and two Cooperative Extension Officers. Annexure 17.3 shows the position in respect of the appointment of additional staff.

17.7 Coordination Committee at the State level and a Credit Sub-Committee for the district, have been set up under the Chairmanship of the Commissioner for Agricultural Production and Rural Development and the District Collector respectively. The District Development Council periodically reviews the progress of the programme.

#### *Coverage*

17.8 The programme was launched in the district during kharif 1962-63 in 30 panchayats spread over 10 blocks and extended to 49 panchayats over 15 blocks during 1963-64 and further to 70 panchayats in the same blocks during the year 1964-65. The area covered under the programme has registered a rise from 0.48 lakh hectares in 1962-63 to 0.85 lakh hectares in 1963-64 and to 1.30 lakh hectares in 1964-65 representing 22 per cent, 38 per cent and 59 per cent respectively of the gross cropped area in the district. The number of farm plans prepared has increased from 0.08

lakh in 1962-63 to 0.46 lakhs in 1963-64 and to 0.73 lakhs in 1964-65, representing 5 per cent, 28 per cent and 45 per cent respectively of the total number of farm families in the district.

### *Fertilizers*

17.9 The offtake of both nitrogenous and phosphatic fertilisers has registered a marked rise under the impact of the package programme as will be seen from the following table:—

*Fertiliser Distribution in Tonnes*

Year	Nitrogenous (in terms of Ammonium sulphate)	Phosphatic (in terms of Super phosphate)
1961-62 (pre-package)	4767	6881
1962-63	6448	8039
1963-64	7005	9492
1964-65	7970	7040

It will be seen that the offtake of nitrogenous fertilisers has increased by about 67 per cent between the pre-package year 1961-62 and 1964-65, whereas, that of phosphatic fertilisers was only marginal.

### *Improved Seeds*

17.10 With the introduction of the IAD Programme, regular seed multiplication programme for paddy crop was initiated in this district. The quantity of improved seeds distributed stood at 154 tonnes in the year 1962-63 and it went up to 398 tonnes in 1964-65. The area covered by improved seeds has gone up from 1400 hectares in 1962-63 to 5354 hectares in 1964-65.

### *Plant Protection*

17.11 The progress made in plant protection measures is reflected by the expansion in area treated against pests and diseases from 17,133 hectares in 1961-62 to 59,744 hectares in 1964-65. The quantity of seeds treated has increased from 178 tonnes in 1962-63 to 301 tonnes in 1964-65 and the pesticide formulations used have shown a rise from 10 tonnes in 1962-63 to 96 tonnes in 1964-65. The following table gives the progress of plant protection work in the district.

Year	Area treated against pests and diseases (hectares)	Seed treated (tonnes)	Pesticide formulations used (tonnes)
1961-62 (Pre-Package)	17133	—	—
1962-63	9553	178	10
1963-64	10729	28	26
1964-65	59744	301	96

17.12 Besides adoption of a complete schedule of plant protection measures for paddy including prophylactic treatment of seed, campaigns were also organized for rodent control, rhinocerous beetle control, cock chaffer grub control, and bunchy-top eradication during 1964-65. Use of plant protection equipment has become quite popular with farmers. Government has allowed 50 per cent subsidy on the sale of hand-operated equipments to encourage acquisition of these implements by farmers. The number of such implements sold to cultivators increased from 269 in 1961-62 to 415 in 1962-63, 559 in 1963-64 and 671 in 1964-65.

17.13 In this district, the VLWs acted as the agents for distribution of pesticides until the year 1962-63. During 1963-64, Government sanctioned a scheme, whereby, the cooperative societies could stock pesticides from Government stores and sell at 5 per cent profit. This has enabled the societies to distribute the pesticides portion of the loan in kind.

#### *Improved Implements*

17.14 The implements workshop building has been completed and the necessary machinery has been installed. The work relating to the testing and development of improved implements has been under-taken at the Research-cum-Testing Centre attached to the Agricultural College, Trivandrum. A seed drill was fabricated and tested at the State seed farm.

#### *Demonstrations*

17.15 Composite demonstrations are laid on cultivators' fields with a view to showing the cumulative effect of the adoption of the package of practices on the yield of crops. The number of such demonstrations has increased from 171 in 1962-63 to 274 in 1963-64 and 419 in 1964-65. The results of these demonstrations have shown increase in average yields as compared to control plots to the tune of 40 per cent in case of paddy and 78 per cent in tapioca during rabi 1963-64 compared to 34 per cent in paddy and 65 per cent in tapioca during rabi 1962-63. During kharif 1964-65, the increase in yield of paddy (1st crop) in demonstration plots over control plots was of the order of 52 per cent as against 45 per cent in

kharif 1963-64. A cost-benefit analysis of the data relating to these demonstrations in 1964-65 shows a return of Rs. 2.2 for each additional rupee expended over improved practices.

17.16 During 1964-65, a large scale demonstration—first of its kind in the State extending over an area of about 344 hectares—was conducted under the direct supervision of the Package staff and it proved to be a success. The average yield obtained was 3112 kg. per hectare and the highest yield obtained was 4663 kg. per hectare. The average yield obtained from the same field during 1962-63 and 1963-64 were only 2074 kg. per hectare and 1585 kg. per hectare respectively. The additional expenditure for the farmers in following the package of practices was only Rs. 49 per hectare.

#### *Soil Testing*

17.17 The building of soil testing laboratory at Alleppey is nearing completion. In the meanwhile soil samples are tested at the Trivandrum laboratory. The progress made in soil testing is indicated below :

Year	Samples collected.	Samples treated.	Fertiliser recommendations made.
1962-63	854	504	496
1963-64	1282	650	650
1964-65	2799	2306	1850

#### *Co-operative Credit and Marketing*

17.18 The number of primary credit cooperative societies in the district went up from 409 in 1961-62 to 467 in 1963-64 but their number was only 387 in 1964-65. However, the membership of these societies increased steadily from 1.24 lakhs in 1961-62 to 1.56 lakhs in 1963-64 and to 1.65 lakhs in 1964-65. During the same period, the share capital has witnessed a rise from Rs. 35.20 lakhs to Rs. 54.00 lakhs. Deposits of these societies went up from Rs. 2.80 lakhs in 1961-62 to Rs. 36.43 lakhs in 1963-64 and to Rs. 43.37 lakhs in 1964-65. The amount of loans advanced marked a rise from Rs. 46.37 lakhs in 1961-62 to Rs. 86.06 lakhs in 1963-64 and to Rs. 103.24 lakhs in 1964-65. The percentage of overdues to demand came down from 31 in 1962-63 to 24 in 1963-64 and then increased to 36 in 1964-65. These societies covered almost all villages in the district.

17.19 The limit for surety loans has been raised from Rs. 500 before the package programme to Rs. 750. In case of joint ownership of land, the primary societies have not been able to advance credit to the extent required in production plans.

17.20 In addition to cooperative loans, the Government advanced *taccavi* loans to agriculturists to the tune of Rs. 1.68 lakhs in 1961-62, Rs.

1.82 lakhs in 1962-63 and Rs. 3.84 lakhs in 1963-64. The short-term loans advanced by societies implementing the programme increased from Rs. 13.33 lakhs in 1961-62 to Rs. 19.31 lakhs in 1962-63, to Rs. 26.37 lakhs in 1963-64 and to Rs. 42.08 lakhs in 1964-65. Loans for different crops are advanced just before the cultivation starts. The percentage of loans advanced in kind to total loans advanced has risen from 13.5 in 1961-62 to 20.6 in 1962-63 and to 30.7 in 1963-64. Efforts are underway to introduce seasonality in loaning. In order to liberalise grant of credit, the individual maximum borrowing limit of a member has been raised from Rs. 2000 to Rs. 5000.

17.21 The membership of the Central Bank in the district increased from 324 in 1961-62 to 342 in 1962-63 and 400 in 1964-65 and the share capital went up from Rs. 10.86 lakhs to Rs. 18.11 lakhs and Rs. 21.54 lakhs. The amount of loans advanced registered a rise from Rs. 41.86 lakhs in 1961-62 to Rs. 56.32 lakhs in 1964-65.

17.22 The number of cooperative marketing societies was 3 in the year 1961-62. Their number increased by one in 1963-64. The membership of these societies rose from 420 in 1961-62 to 469 in 1963-64 and to 507 in 1964-65. Their share capital increased from Rs. 0.93 lakh in 1962-63 to Rs. 1.83 lakhs during 1963-64 and to Rs. 2.19 lakhs in 1964-65. These societies handled mainly coconuts. During 1962-63 and 1963-64, two of these societies were given financial assistance for construction of godowns and for installation of processing units. During 1963-64, one more marketing society was organised for handling paddy. An amount of Rs. 3.13 lakhs has been made available to this society by the District Cooperative Bank for undertaking the marketing of paddy.

#### *Storage Godowns*

17.23 As against 156 godowns needed to saturate the district, 20 godowns were in existence at the end of June 1964 and 51 were under construction. During the year 1964-65, 43 godowns were added to the number existing last year bringing the total number of godowns constructed to 63.

## II

#### *Results of Agronomic and Agro-economic Surveys, 1962-63*

17.24 In Alleppey district, the Agro-economic enquiry was started in 1962-63. The detailed assessment of the pattern of fertilizer consumption and other practices was attempted under this enquiry, based on a sample of 116 villages spread over 16 IADP blocks in the district and 4 control blocks in the neighbouring districts. In each selected village, 8 cultivators' holdings were studied. The control blocks selected were

Chavara and Anchalamood in Quilon district and Pallom and Madapally in Kottayam district.

#### *Holding size*

17.25 The sampled holdings were classified into four groups according to their size. The table below shows the percentage distribution of the cultivators and the cultivated area according to size of holdings.

	Holding size			
	Very small (upto 1 hectare)	Small (1-2 hectares)	Medium (2-4 hectares)	Large (above 4 hectares )
Percentage of the cultivators in the group to the total	65	16	12	7
Average size in hectare	0.37	1.44	2.84	7.50
Percentage of culti- vated arca for the group to the total	22	21	26	31

It could be seen that a good majority of the cultivators had only very small holdings. About 80 per cent of the cultivators sampled were having less than 2 hectares. But holdings of more than two hectares accounted for nearly 60 per cent of the total cultivated area.

#### *Cropping pattern*

17.26 Paddy is the main foodgrain crop in the district. Among the three paddy crops in the district, namely *viruppu* (first crop), *mundakan* (second crop) and *punja* (third crop) the most important one is *punja* which accounts for about 58 per cent of the gross area under paddy. It can be seen from Annexure 17.4 giving the percentage shares of various crops in the total area under different size groups of holdings that *punja* cultivation is more popular among cultivators having larger holdings. This is mainly because *punja* cultivation is generally done on a commercial scale in larger fields of a special tract with controlled water supply. It can be seen from the same Annexure that percentage of area under coconut and other garden crops is more in the smaller holdings than in the larger ones.

*Facilities for supply, storage and marketing*

17.27 For supply of chemical fertilizers, 58 per cent of villages sampled were having facilities, either within the village or in the neighbourhood. For supply of pesticides, fungicides etc., about 60 per cent of the villages were having facilities within easy approach. For marketing of cash crops, about 33 per cent of the villages were having facilities, whereas for marketing of foodgrains only 16 per cent were enjoying such facilities. Although Government and cooperatives were the main agencies for these production supplies, private concerns also played an important role. Marketing of agricultural produce, however, was mainly dependent on private concerns and others.

*Use of manures and fertilisers*

17.28 About 35 per cent of the sampled cultivators in the district applied chemical fertilizers to their fields. During the year 1962-63, 6400 tonnes of nitrogenous fertilizers and 8000 tonnes of phosphatic fertilizers were distributed in the district. About 90 per cent of these fertilizers were applied to paddy crops. First and second crops of paddy together received only 15 per cent of the total quantity of fertilizers distributed. More than 70 per cent of the fertilizer went in for the third paddy crop. In this district, fertilizers were applied mainly as mixtures. For the first paddy crop, 26 per cent of the area was benefited by suitable fertiliser mixtures. For the second crop, 31 per cent of the area was benefited by fertilizer mixtures. Besides, 12 per cent of the area received nitrogenous fertilizer, and 9 per cent received phosphatic fertilizer. For the third crop, about 80 per cent of the area received fertilizer mixtures. Besides, 31 per cent received nitrogenous fertilizer, 23 per cent received phosphatic fertilizer and 9 per cent received potassic fertilizer. Because of controlled water supply, fertilizer application is generally common in the *punja* tract which is mostly in the hands of large scale cultivators. If fertilizer consumption is to be stepped up in the district, much scope exists in other two paddy crops namely, *viruppu* and *mundakan*.

17.29 There is some association between holding size and percentage area benefited by fertilizers in the district particularly in respect of the third crop. For the first crop, the percentage of area benefited by different fertilizers is more or less same in different holding size groups. For the second and third crops, percentage of area benefited by fertilizer mixtures did not increase substantially with the increase in the size of holding. But the percentage area benefited by nitrogenous fertilizer was considerably higher in the larger holding size groups than in the smaller holding size groups. It appears that application of fertilizer-mixtures as a basal dressing was universally accepted irrespective of the size of holdings, whereas the additional top-dressing with nitrogenous fertilizer was done more commonly by cultivators of larger holdings.

17.30 The following table gives the rates of application of nitrogenous, phosphatic and potassic fertilizers as practised by the cultivators.

	Rates of application (kg./hect.)			Range of the recommended rate (kg./hect.)		
	First crop	Second crop	Third crop	First crop	Second crop	Third crop
Nitrogenous (ammonium sulphate or equivalent)	79	92	112	113 to 170	113 to 170	113 to 180
Phosphatic (single superphosphate or equivalent)	80	55	161	137 to 205	137 to 205	210 to 280
Potassic			41	40 to 62	40 to 62	38 to 62

These rates have been worked out after apportioning their contents in the fertilizer mixtures. The fertilizer recommendation in the district varied considerably with the tract, the duration of the crop and on the broad agronomic classification of the soil. The ranges of recommendations are presented in this table. It can be seen that for the first two crops of paddy, there is a wide gap between the average rate of application of different fertilizers and their least recommended dose. For the third crop of paddy, however, the average rates of application of nitrogenous and potassic fertilizers are just near the lowest recommended rates.

### III

#### *Results of crop-cutting surveys conducted during 1962-65*

17.31 The overall yield rate of rice in the district remained more or less stationary during the period under study. A slight increasing trend in the yield rate of second crop was balanced by a decreasing trend in the yield rate of the first crop. The yield rate of third crop was fluctuating.

17.32 Annexure 17.7 gives annual production of rice in the district. It is seen that the yearly production during the period of three years 1962-63 to 1964-65 was, on the average, about 6 per cent more than that in the period of three years preceding it. This is only due to a small increase in the area under paddy during the initial year of the programme.

17.33 The breakup of sampled fields according to different combinations of agronomic practices namely, irrigation, manuring and fertilizer application along with the average yield in each class has been presented in Annexure 17.8. For the first two crops of paddy, the results for the irrigated fields are not presented separately since most of the fields were unirrigated. The first crop of paddy fields receiving fertilizers gave, on an average, additional yield of about 2 quintals per hectare over the others. For the second crop, however, the response to fertilizer application was still greater. On an average, an additional yield of about 5 quintals per hectare was noticed in fields receiving fertilizers as compared to the others. This indicates that substantial increase in food production in the district can be achieved by concentrating efforts to increase the extent of fertilizer application to the second crop of paddy. For the third crop, since the number of fields not receiving fertilizer was very small, a comparison between the yield rates of fields receiving and not receiving fertilizers is not very informative.

#### *Source of seed*

17.34 The distribution of fields according to source of seed, along with the average yield in such fields is presented in Annexure 17.9. For the first crop, in all the three years, none of the sampled fields was found to be sown with seed obtained from Government or cooperative societies. For the second and third crops, a small percentage of fields were sown with seeds obtained from Government or cooperative societies.

#### *Protection against pests and diseases*

17.35 Practically, no plant protection measures were adopted by cultivators for the first crop of paddy. For the second crop, about 6 per cent of the sampled fields and for the third crop about 30 per cent of the sampled fields were protected against insects and pests. But, only in less than 5 per cent of the fields the cultivators had taken control measures against diseases.

### **B : PALGHAT**

#### I

17.36 Palghat district is situated at the west coast of Kerala with Western Ghats and Arabian Sea as its eastern and western boundaries respectively. The district has a population of 17.76 lakhs and covers a geographical area of 5,10 thousand square kilometres and is delimited into 16 blocks (15 Community Development Blocks and one Tribal Development Block). It comprises of 6 taluks and 303 villages. There are 81,639 cultivating families in the district. The density of population works out to 350 persons per square kilometre. The district is served by 972 kilometres of main roads and 152 kilometres of ancillary roads.

17.37 Rainfall averaging 293 cm. per annum is received mostly during May to October. The soil types common in the district are sandy loam, black soil, clayey loam, laterite red loams and sandy belt in coastal areas.

#### *Land Utilisation*

17.38 During the three years preceding the introduction of the programme (1959-60 to 1961-62), the net area sown averaged 2.4 lakh hectares which formed 47 per cent of the total geographical area. About 31 per cent of the net area sown was double cropped making the gross cropped area 3.2 lakh hectares. About 25 per cent of the area under paddy and 60 per cent of that under sugarcane is irrigated. The land utilisation data for the district for the three years ending 1961-62 are given in Annexure 17.10.

#### *Cropping Pattern*

17.39 The main crop of the district is paddy accounting for 60 per cent of the gross cropped area. Other crops cultivated in this district are coconut, arecanut, pepper, ginger, tapioca, sweet-potato, cotton and sugarcane.

17.40 During the three years preceding the introduction of the programme, cereals output in the district averaged 3.03 lakh tonnes per year including 2.99 lakh tonnes of rice. Oilseed production amounted to 0.14 lakh tonnes. Annexure 17.11 gives the area, production and yield per hectare of foodgrains and major commercial crops.

#### *Land Tenure*

17.41 The rights over the land in the district are mainly of three types i.e., *janmam*, *kanam* and *pattom*. The *janmam* right which is supposed to be the complete ownership over the land, is mainly with the Hindu religious institutions and big land lords. The cultivator of the land has got either *kanam* or *pattom* (lease) right over the land. The enactment made by the Government from time to time has helped the actual cultivators to have security of right over the land which he cultivates, subject to the conditions laid out therein.

#### *Administrative Arrangements*

17.42 The District Collector is directly responsible to the Government for the implementation of the Package Programme. The Joint Director of Agriculture as Project Officer is assisting the District Collector. Besides, there are Subject-matter Specialists in Agronomy, Farm Management, Soil Science, Plant Protection, Statistics, Seed Development and Agricul-

tural Engineering at the district level. On the cooperative side, there is one Deputy Registrar and one Assistant Registrar of cooperative societies and on the information side, there is an Agricultural Information Officer assisted by one Additional Information Officer.

17.43 At the block level, the additional staff provided consists of 2 Agricultural Extension Officers, one Extension Officer for cooperation and 10 Village Level Workers. Except for 3 Agricultural Extension Officers, 2 Cooperative Extension Officers and 13 Village Level Workers at the block level and 1 Seed Inspector at the district level, all the other additional staff sanctioned was in position as on June, 1965. The total strength of staff over and above the Project Officer and 4 Subject-matter Specialists, consists of 15 Block Development Officers, 45 Agricultural Extension Officers, 315 Village Level Workers, 2 Deputy Registrars, 30 Cooperative Extension Officers, one Agricultural Information Officer, one Assistant Agricultural Engineer, one Assistant Soil Chemist and one Seed Development Officer. Annexure 17.12 shows the position in respect of the appointment of additional staff sanctioned under the programme.

17.44 To ensure proper coordination between the different departments concerned with the IADP, coordination committees have been set up at the State and district levels. The Production Commissioner, Agriculture and Rural Development, Government of Kerala is the Chairman of Coordination Committee at the State level and the District Collector at the district level. Both these coordination committees review the progress of the programme periodically.

#### *Coverage*

17.45 The programme started in the district during kharif 1962-63 in 82 villages spread over 5 blocks and during the year 1963-64 it extended to 134 villages in 7 blocks. In 1964-65, the programme covered 15 blocks and 298 villages. The cultivated area covered under the programme has witnessed a rise from 0.31 lakh hectares in 1962-63 to 1.08 lakh hectares in 1963-64 and 1.81 lakh hectares in 1964-65 representing 10 per cent, 34 per cent and 57 per cent respectively of the total cultivated area in the blocks. The number of farm plans prepared has gone up from 7,382 in the year 1962-63 to 23,848 in 1963-64 and to 57,000 in 1964-65 representing 9 per cent, 29 per cent and 70 per cent respectively of the total number of cultivating families in the district.

#### *Fertilizers*

17.46 The distribution of nitrogenous and phosphatic fertilizers in the district is shown in the following table.

*Fertilizer Distribution in Tonnes*

Year	Nitrogenous (in terms of ammonium sulphate)	Phosphatic (in terms of super-phosphate)
1961-62 (pre-package)	2285	1471
1962-63	6480	2424
1963-64	8294	3226
1964-65	11043	3898

17.47 It will be seen that the offtake of nitrogenous fertilizers has gone up by 383 per cent and that of phosphatic fertilizers by 165 per cent during the period 1961-62 to 1964-65.

17.48 The primary credit societies obtain fertilizers directly from the 9 central depots of F.A.C.T. in the district and distribute the same on an agency basis. The number of retail depots for fertilizer distribution has increased from 240 in 1961-62 to 303 in 1962-63 and 355 in 1963-64.

*Improved Seeds*

17.49 There is a comprehensive scheme for the seed multiplication, processing and distribution for the district. The breeders' seeds obtained from the Agricultural Research Station at Pattambi is multiplied in two stages for bulk distribution. The first stage of multiplication is at the five State seed farms in the district. Foundation seeds obtained from these farms go to the registered growers in all the blocks. The registered seed growers are responsible to supply to the blocks, improved seeds which would be distributed on a mass scale. The staff working in the seed programme and also in the blocks take the utmost care to procure and distribute pure seeds only. This they do by regular inspection of fields and analysis of seed samples.

17.50 A scheme to process the procured paddy seed is in progress in all the blocks. Processing is done by cleaning and drying the seed properly and treating it with a fungicide. The seed is then packed in 25 kg. cloth bags for distribution.

17.51 The quantity of improved seeds distributed was 216 tonnes during the year 1961-62 and this increased to 432 tonnes in 1963-64 and 518 tonnes in 1964-65. The area covered by improved seeds was 4391 hectares in 1961-62, 8747 hectares in 1963-64 and 9440 hectares during 1964-65.

### *Plant Protection*

17.52 In order to ward off attacks of pests and diseases, timely measures are taken for the prophylactic treatment of seeds and crops on an area-wide basis. The progress of plant protection work is shown in the following table—

Year	Area treated against pests and diseases (Hectares)	Seed treated (Tonnes)	Pesticide for- mulations used (Tonnes)
1961-62 (pre-package)	24878	..	34
1962-63	24382	11	26
1963-64	22516	164	35
1964-65	28000	693	148

### *Improved Implements*

17.53 The building of the agricultural implements workshop has been constructed at Malampuzha. Pending the establishment of the workshop, demonstrations with improved implements manufactured by the Research-cum-testing Centre, Vellayani are being done in the field.

### *Demonstrations*

17.54 Demonstrations of the composite type, laid out on cultivators' fields, are being used as the media for propagating the recommended package of practices. The number of composite demonstrations laid was 227 in the year 1962-63. This number increased to 466 in 1963-64 and to 818 during 1964-65. The results of these demonstrations have shown an increase in the average yields in demonstrations as compared to 'control plots'. In kharif 1964-65, the average yield in demonstration plots over 'control' plots was 40 per cent higher in case of paddy while in kharif 1963-64 the yield of paddy was higher by 42 per cent. In rabi 1964-65, the yield of paddy in demonstrations as compared to 'control' plots was 38 per cent higher. Economics of these demonstrations on paddy held during 1964-65 had shown a return of Rs. 2.37 to Rs. 2.56 for each additional rupee expended on the recommended practices.

### *Soil Testing*

17.55 Pending installation of necessary equipment at the soil testing laboratory constructed at Pattambi, the soil samples are being analysed at the laboratory at Trivandrum. The progress made in testing of soil samples is given below.

Year	Samples collected	Samples tested	Fertilizer recommendations made.
1962-63	828	496	329
1963-64	1580	814	439
1964-65	1915	1202	1112

#### *Minor Irrigation*

17.56 The major irrigation schemes in the district are Malampuzha, Walayar and Meenkara. These projects command only an area of 30,925 hectares out of the total area of 106,710 hectares of paddy lands. The Kanjirapuzha, Pothundy, Palakhuzhi and Silent Valley Schemes are in different stages of implementation, which, when completed, will benefit large areas in this district. About 132 minor irrigation schemes have been completed in this district covering about 600 to 800 hectares. This includes the works done by the P.W.D. A separate wing for minor irrigation under the Superintending Engineer has since been established in the State for the speedy execution of minor irrigation works. A comprehensive list of minor irrigation works has been worked out for every block in this district. These works will be executed using the funds under Community Development, Rural Man-power Scheme and other departmental funds. As there are many rivers and canals, there is ample scope for lift irrigation works in the district. Pump-sets are being issued to cultivators on hire-purchase system from the Agricultural Department and community development programme. The number of pump-sets issued in this district utilising Agricultural Department's funds were 43 in 1962-63, 95 in 1963-64 and 79 in 1964-65.

#### *Cooperative Credit and Marketing*

17.57 The number of primary credit societies went up from 155 in 1961-62 to 158 in 1963-64 and to 165 in 1964-65 and their membership increased from 0.90 lakh in 1961-62 to 1.17 lakhs in 1963-64 and to 1.20 lakhs in 1964-65. The increase in their share capital was from Rs. 23.08 lakhs in 1961-62 to Rs. 29.96 lakhs in 1963-64 and Rs. 33.00 lakhs in 1964-65. The deposit resources of these societies showed a marked improvement from Rs. 43.83 lakhs in 1961-62 to Rs. 53.57 lakhs in 1963-64 and Rs. 67.00 lakhs in 1964-65. The loans advanced by these societies also showed a steady increase from Rs. 108.77 lakhs in 1961-62 to Rs. 129.12 lakhs in 1963-64 and to Rs. 175.00 lakhs in 1964-65. The proportion of loans advanced in kind has risen from 4 per cent in 1962-63 to 9 per cent in 1963-64. The percentage of overdues to demand, which increased from 18 in 1961-62 to 22 in 1962-63, came down to 18 during 1963-64 and then went up to 25 in 1964-65. The coverage of villages by these societies is cent per cent in the district while the percentage of agricultural popu-

lation covered has risen to 45 per cent. In addition to cooperative loans, the State Government advanced *taccavi* loans to the tune of Rs. 8.88 lakhs during 1962-63 and Rs. 10.78 lakhs during 1963-64.

17.58 There was no separate district cooperative bank for Palghat district when the Package Programme was started. Palghat district was under the Malabar Central Cooperative Bank, Kozhikode. Subsequently, this was trifurcated and Palghat Cooperative Bank came into existence with effect from 1st July 1963. The membership of the district cooperative bank witnessed a rise from 247 in 1961-62 to 317 in 1964-65. During the same period, the share capital went up from Rs. 9.02 lakhs to Rs. 26.25 lakhs.

17.59 The number of primary marketing societies was 6 in 1961-62 and 7 each in 1963-64 and 1964-65 with a membership of 5,737 in 1961-62 and 7075 in 1964-65. The share capital of these societies registered a rise from Rs. 1.85 lakhs in 1961-62 to Rs. 3.89 lakhs in 1964-65. The value of agricultural produce marketed by the societies was Rs. 10.93 lakhs in 1961-62 and Rs. 16.75 lakhs in 1963-64. This has increased sharply to Rs. 169.90 lakhs in 1964-65.

Three of the six marketing societies recovered dues of agricultural credit societies to the extent of Rs. 0.48 lakh and Rs. 3.60 lakhs during 1962-63 and 1964-65 respectively.

#### *Storage Godowns*

17.60 As against 150 godowns needed to saturate the district, 41 godowns were existing as on 30th June, 1964. During the year 1964-65, 19 godowns were added to the number existing last year, bringing the total of godowns constructed to 60.



II

#### *Results of agronomic and agro-economic survey, 1962-63*

17.61 In Palghat district the agronomic and agro-economic enquiry was started in 1962-63. Detailed assessment of the pattern of fertilizer consumption and other practices was attempted under the enquiry conducted in a sample of 116 villages spread over 15 IADP blocks in the district and 4 control blocks in the neighbouring districts. In each selected village, 8 cultivators' holdings were studied. The control blocks selected were Tanur and Wandur of Kozhikode and Wadakanchery and Ollukara of Trichur district.

#### *Holding size*

17.62 The holdings were classified into four groups according to size. The table below shows the distribution of the cultivators and the cultivated area according to size of holdings:

Item	Holding size			
	Very small (upto 1 hectare)	Small (1-2 hectares)	Medium (2-4 hectares)	Large (above 4 hectares)
Percentage of cultivators in the group to the total sampled	34	21	22	23
Average size in hectares	0.44	1.44	2.99	7.84
Percentage of the cultivated area for the group to the total	5	10	23	62

Nearly one-third of the cultivators' holdings sampled fell in the category of very small holdings. The remaining two-thirds were almost equally distributed among the three categories, namely, small, medium and large. In terms of area, a major portion, namely, 62 per cent of the cultivated area belonged to cultivators having large holdings.

#### *Cropping pattern*

17.63 Paddy is the major crop in the district. The first paddy crop (*viruppu*) and second paddy crop (*mundakan*) are grown in almost equal area. There is no major difference between holding sizes in the cropping pattern excepting that in small holdings there is a large proportion of area under dry land crops like coconut and other garden crops.

#### *Facilities for supplies, storage and marketing*

17.64. For supply of chemical fertilizers, almost all villages had facilities either within the village or in the neighbourhood. For supply of pesticides, fungicides etc. 20 per cent of the villages had facilities within the village, whereas about 60 per cent were depending upon facilities existing in the neighbouring villages. Although cooperative societies and Government were the major agencies for these production supplies, private concerns also played an important role in their distribution. Only 10 per cent of the sampled villages were reported to be served by cooperative societies for marketing of agricultural products.

#### *Use of manures and fertilizers*

17.65 About 33 per cent of the cultivators in the district applied chemical fertilizers to their fields while in the control area only 2 per cent

had done so. A good majority of the cultivators in the district as well as in the control area had applied farmyard manure or compost. Only 33 per cent of the nitrogenous fertilizers and 8 per cent of the phosphatic fertilizers consumed were used for the first paddy crop (*viruppu*) which accounted for 38 per cent of the gross cropped area in the district. The bulk of the quantity of the nitrogenous and phosphatic fertilizers distributed went in for second paddy crop (*mundakan*). About 65 per cent of the quantity of nitrogenous fertilizers and 92 per cent of the quantity of phosphatic fertilizers were used for this crop. For fertilizer mixture, the shares in consumption of the two crops of paddy were somewhat equal.

*Percentage area benefited by manures and fertilizers and their rates of application*

17.66 For *viruppu* paddy (first crop) 29 per cent of the area was benefited by nitrogenous fertilizers and 23 per cent by fertilizer mixtures. Almost all fields were treated with F.Y.M. or compost. Green leaf manure was applied to 37 per cent of the area under this crop. For *mundakan* paddy (second crop) 41 per cent of the area was benefited by nitrogenous fertilizers. Fertilizer mixtures were applied in 42 per cent of the area under this crop. Almost all the area was benefited by F.Y.M. or compost and 56 per cent of the area was treated with green leaf manure. In the control area, percentage area benefited by fertilizer application was less than 5 per cent for either of the paddy crops, although percentage area benefited by organic manures was of the same order as in the district.

17.67 There was a positive association between size of holding and percentage area benefited by chemical fertilizers. This can be seen from the following table:

Crop	Fertilizer	Percentage area benefited			
		Very small	Small	Medium	Large
Paddy-first crop	Nitrogenous	3	9	25	33
	Mixtures	7	18	26	34
Paddy-second crop	Nitrogenous	3	13	29	54
	Mixtures	7	24	36	50

The average rates of application of manures and fertilizers for the two paddy crops in the district, separately for different holding size groups, are given in Annexure 17.14. The overall position taken together for chemical fertilizers is summed up in the following table:

(in kg. per hectare)

Kind of chemical fertilizer	Viruppu		Mundakan	
	Av. rate of application	Av. recommended rate	Av. rate of application	Av. recommended rate
Nitrogenous (Ammonium sulphate or equivalent)	85	170	166	195
Phosphatic (Super phosphate or equivalent)	64	205	100	205
Potassic	15	62	14	62

The rates given above are after apportioning the fertilizer mixtures into different components. It can be seen that generally the gap between rate of application and recommended rate is much more for the first crop (*viruppu*) than for the second crop (*mundakan*). For the first crop, the average rate of application of nitrogenous fertilizer is only half of the average recommended rate. Phosphatic and potassic fertilizers are applied at still lower rates. For the second crop (*mundakan*), however, the average rate of application of nitrogenous fertilizers is not much less than the average recommended rate. For phosphatic and potassic fertilizers, there is wide gap between the average rate of application and the average rate recommended.

### III.

#### *Results of crop-cutting surveys conducted during 1962-65*

17.68 The crop-cutting surveys for yield assessment are being conducted in Palghat district from the year 1962-63 onwards. Annexure 17.15 gives the average yield of rice in quintals per hectare in the district and its control area. Second crop of paddy (*mundakan*) has registered a steady increase in the yield rate from year to year. For the first crop, although the increase in the yield rate from the year 1962-63 to 1963-64 was substantial, further increase from the year 1963-64 to 1964-65 was not significant. In the control area, although the yield rate in 1963-64 was considerably higher than that during 1962-63, it has gone down in the year 1964-65 for both the crops. If we consider the average for 3 years, it can be seen that during the period 1962-63 to 1964-65 when the programme was in operation, the average yield for either of the crops was significantly higher than that in the period of 3 years preceding it.

17.69 Annexure 17.16 gives the production of rice in the district for different years under study. The average annual production of rice during the period of 3 years 1962-63 to 1964-65 was about 9 per cent more than that in the period of 3 years preceding it. This was partly due to an increase in the area under the crop and partly due to an increase in the average yield.

17.70 The average yield of rice separately in the holdings of participant and non-participant cultivators is presented in Annexure 17.17. The yield rates in the holdings of participant cultivators were consistently higher than those in the fields of non-participants. Although there was a steady increase in the percentage of participant cultivators from year to year, more than 60 per cent of the cultivators were non-participants during 1964-65.

17.71 Annexure 17.18 gives yield rates of fields receiving different combinations of agronomic practices, namely, irrigation, manuring and fertilizer application. Comparing yield rates in irrigated and un-irrigated fields it is seen that irrigated fields of *viruppu* paddy have given 28 per cent more yield per hectare than those which are unirrigated. For *mundakan* paddy the irrigated fields have given 41 per cent more yield per hectare than those which are unirrigated. *Viruppu* fields where chemical fertilizers had been applied yielded 15 per cent to 20 per cent more per hectare than those which did not receive fertilizers. Similarly, *mundakan* fields treated with chemical fertilizers yielded above 30 per cent more than those which were not. For the first crop, the additional yield due to fertilizer application was of the same order in irrigated and unirrigated fields. But in unirrigated fields of this crop the practice of fertilizer application was much less common than in irrigated fields. Since fertilizer responded equally in irrigated and unirrigated fields, there is considerable scope for intensifying fertilizer application even in unirrigated fields. For the second crop also the response to fertilizer application was more or less of the same order in the irrigated and unirrigated fields. The additional yield obtained from the fields receiving fertilizer was of a higher order for the second crop than for the first crop. During 1964-65, almost all the irrigated fields growing the second crop were fertilized, whereas only one-third of the unirrigated fields of the same crop, received fertilizer. It shows that if fertilizer consumption has to be stepped up, the farmers have to be educated in the use of fertilizers even in unirrigated fields.

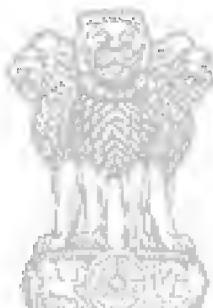
#### *Source of Seed*

17.72 Annexure 17.19 gives the average yield of rice separately for fields sown with seeds obtained from different sources. It can be seen that the yield rates in fields sown with seeds obtained from Government or cooperatives were consistently higher than those in the fields sown with seeds

obtained from other non-institutional sources. The percentage of fields sown with seeds obtained from Government or cooperatives was, however, very small.

*Plant protection measures*

17.73 Practically no plant protection measures were adopted for the first crop of paddy. For the second crop, however, about 23 per cent of the fields were protected against insects and pests. No other plant protection measures were adopted by the farmers.



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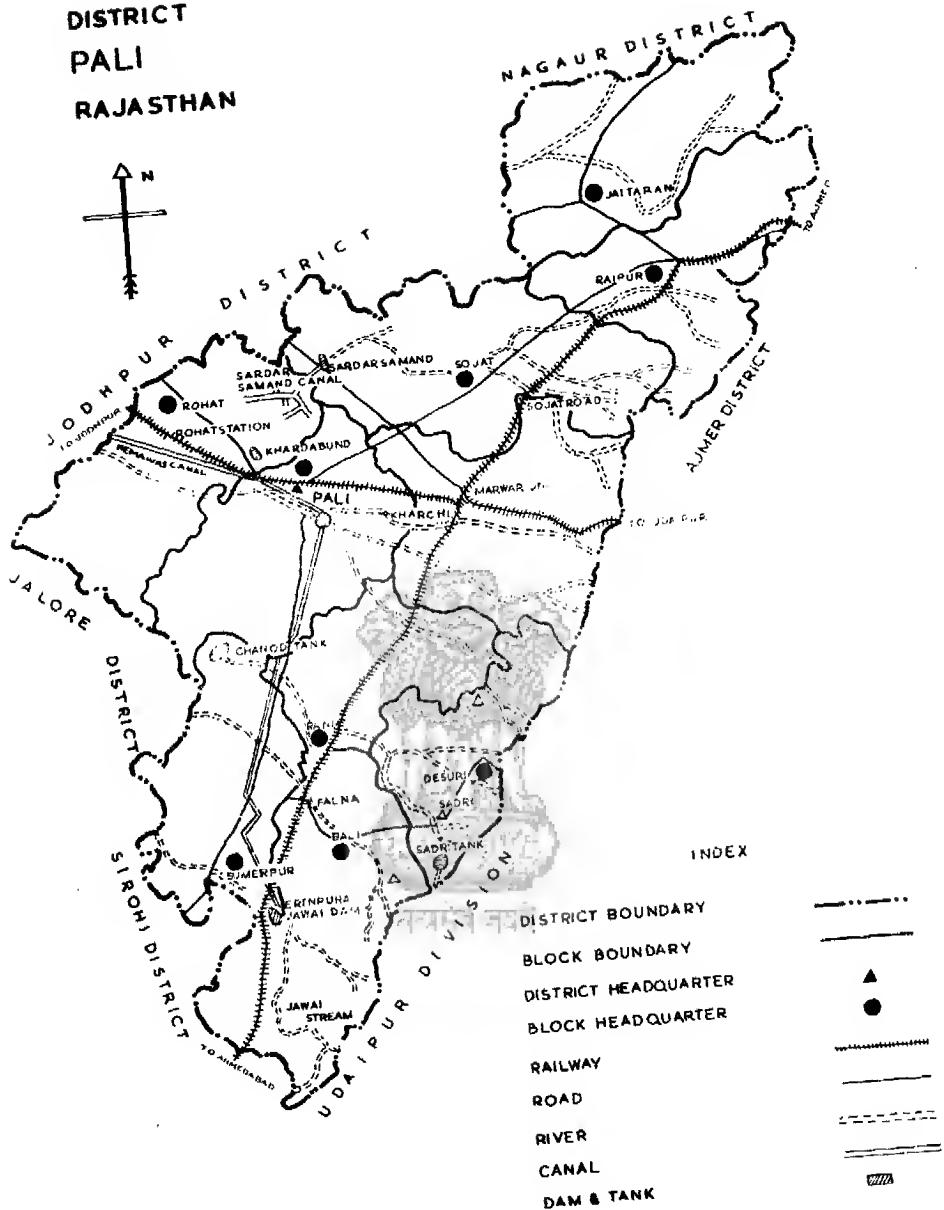
## ANNEXURE 17.1

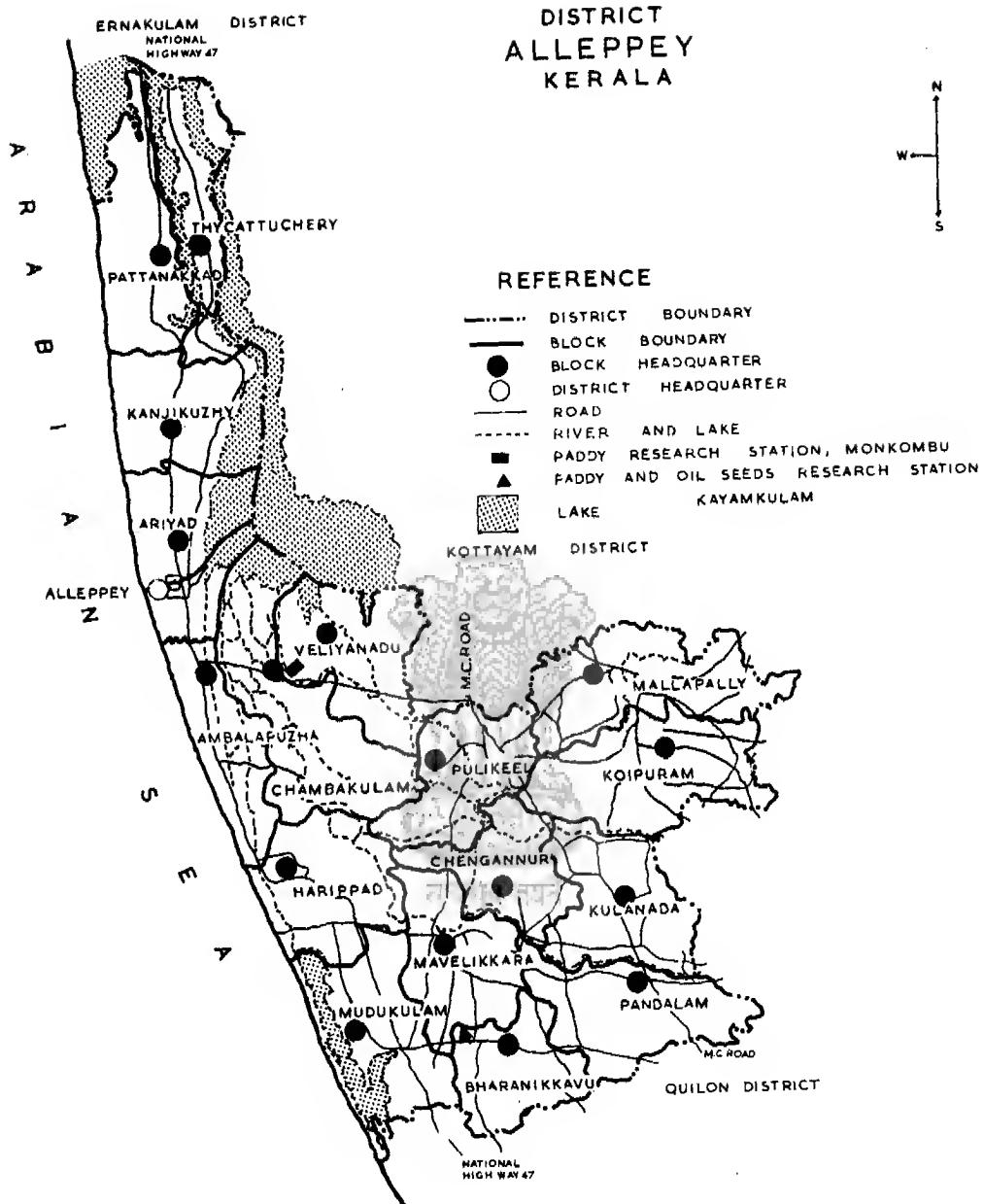
*Land Utilisation—Alleppey (Kerala)*

('00 Hectares)

S. No.	Type of area according to use	1959-60	1960-61	1961-62	Average
1	2	3	4	5	6
1.	Geographical area	1868	1868	1868	1868
2.	Forest	5	5	5	5
3.	Barren & uncultivable land	29	28	26	28
4.	Land put to non-agricultural uses including homesteads, grave yard, road, canals, lakes etc.	102	102	105	103
5.	Cultivable waste	31	28	26	28
6.	Permanent pasture and other grass lands	5	5	4	5
7.	Land under miscellaneous tree crops and groves not included in the net area sown	47	50	46	48
8.	Current fallows	59	59	59	59
9.	Fallow land other than current fallows	11	10	9	10
10.	Net area sown	1579	1581	1588	1583
11.	Net area sown expressed as percentage of geographical area	84.5	84.6	85.0	84.7
12.	Area sown more than once	632	638	626	632
13.	Area sown more than once expressed as percentage of net area sown	40.0	40.3	39.4	39.9
14.	Gross cropped area	2211	2219	2214	2215

DISTRICT  
PALI  
RAJASTHAN





## ANNEXURE 17.2

*Estimates of Area and Production of Major Crops—Alleppey (Kerala)*

Crops	Area (hectares)				Production (Metric tons)				Yield (Quintals per hectare)			
	1959-60	1960-61	1961-62	Average 1959-62	1959-60	1960-61	1961-62	Average 1959-62	1959-60	1960-61	1961-62	Average 1959-60
1	2	3	4	5	6	7	8	9	10	11	12	13
1. Rice	78022	79196	76129	77782	102717	109931	115542	109397	13.17	13.88	15.18	14.1
2. Total cereals	78022	79196	76129	77782	102717	109931	115542	109397	13.17	13.88	15.18	14.1
3. Sesamum	7484	4095	4095	5225	1431	356	354	720	1.94	0.87	0.86	1.4
4. Total oil-seeds	7484	4095	4095	5225	1451	356	354	720	1.94	0.87	0.86	1.4
5. Sugarcane (Gur)	5228	5463	5463	5385	21671	23276	22576	22588	41.45	42.61	41.33	41.80
6. Cotton	—	117	117	117	—	28.4	28.4	—	—	2.43	2.43	2.43

## ANNEXURE 17.3

*Additional staff sanctioned and in position—IADP Alleppey*

S. No.	Category	Additional staff sanctioned			Additional staff in position on 30th June			
		per block	as on 30th June		1963	1964	1965	1963
1	2	3	4	5	6	7	8	9
<b>A. Block Level</b>								
1.	Agri. Extension Officer	2	16	30	34	16	25	33
2.	Village Level Worker	10	65	150	170	65	150	167
3.	Cooperative Extension Officer	1	9	15	17	9	15	15
<b>B. District Level</b>								
1.	Project Officer	—	1	1	1	1	1	1
2.	Subject-matter Specialist	—	3	3	3	3	3	3
3.	Additional District Agriculture Officer	—	—	1	1	—	1	1
4.	Assistant Director of Agriculture	—	1	1	1	1	1	1
5.	Dy. Registrar Coop. Societies	—	—	1	1	—	1	1
6.	Marketing Officer	—	—	1	1	—	1	1
<b>C. Agricultural Information Unit</b>								
1.	District Agri. Information Officer	—	1	1	1	1	1	1
2.	Additional Distt. Agri. Information-cum-Radio Specialist	1	1	1	1	1	1	1

ANNEXURE 17.3 (*Continued*)

1	2	3	4	5	6	7	8	9
3.	Projectionist	—	1	1	1	1	1	1
4.	Artist	1	1	1	1	1	1	1
5.	Press Operator	1	1	1	1	—	—	—
6.	Asst. Operator	—	1	1	—	—	—	—
7.	Compositor	—	1	1	—	—	—	—
<b>D. District Agricultural Engineering Unit</b>								
1.	Agricultural Engineer	—	—	—	—	—	—	—
2.	Asstt. Agricultural Engineer	—	1	1	1	1	1	1
3.	Workshop Mechanic	—	—	3	3	—	1	1
4.	Artisan	—	—	2	2	—	—	—
<b>E. Soil Testing Laboratory</b>								
1.	Specialist in Soil Science	—	—	1	1	—	1	1
<b>F. Quality Seed Programme</b>								
1.	Seed Development Officer	—	not sanctioned	1	1	not sanctioned	1	1
2.	Seed Inspector	—	sanctioned	1	2	sanctioned	1	2
<b>G. Benchmark Survey</b>								
1.	Statistical Officer	—	-do-	1	1	-do-	1	1
2.	Statistical Inspector	—	-do-	2	2	-do	2	2
3.	Investigator	—	-do-	9	9	-do-	9	9

## ANNEXURE 17.4

*Percentage shares of various crops in the total area under different size groups of holdings in Alleppey district during 1962-63*

Crop	Holding Size				
	Very small	Small	Medium	Large	Pooled
1	2	3	4	5	6
Rice ( <i>viruppu</i> )	8	12	10	5	9
Rice ( <i>mundakan</i> )	5	8	9	6	7
Rice ( <i>punja</i> )	5	14	19	43	23
Coconut	34	26	22	17	24
Tapioca	17	12	10	6	19
Arecanut	4	4	5	5	5
Rubber	1	1	4	3	2
Banana	5	2	3	1	3
Tubers	7	5	6	4	5
Pepper	4	6	4	4	4
Others	10	10	8	6	8
Total	100	100	100	100	100

कल्पना विभाग

*Percentage area under rice crops in Alleppey district benefited by different manures and fertilizers and their average rates of application during the year 1962-63.*

Crop	Kind of organic manure or chemical fertilizers	Percentage area benefited						Average rate of application (quintals per hectare)					
		Holding size			Holding size			Very Small	Med- ium	Very Small	Med- ium	Large	Pooled
		Small	Med- ium	Large	Small	Med- ium	Large						
1	2	3	4	5	6	7	8	9	10	11	12		
First crop (viruppu)	F.Y.M. or compost Nitrogenous fertilizers* Phosphatic fertilizers** Fertilizer mixture	64 8 1 22	50 5 4 26	58 8 4 27	58 4 4 29	57 6 5 26	27 73 4 25	20 79 12 37	29 0.79 3.73 1.42	28 0.93 1.77 1.36	26 0.37 3.37 1.47	26 0.79 2.53 1.37	
Second crop (mundan)	F.Y.M. or compost Nitrogenous fertilizers* Phosphatic fertilizers** Fertilizer mixture	81 3 2 25	73 13 11 32	85 18 19 37	75 18 19 31	79 12 9 31	37 1.05 0.42 1.36	30 0.91 — 2.50	30 1.26 — 1.17	27 0.67 — 1.17	35 0.95 0.98 1.41		
Third crop (puzja)	F.Y.M. or compost Nitrogenous fertilizers* Phosphatic fertilizers** Potassic fertilizer Fertilizer mixture	68 9 4 — 62	36 18 3 — 76	38 27 20 8 74	34 38 30 8 83	37 31 23 9 79	27 0.45 2.43 — 2.43	19 0.88 2.30 — 1.58	12 0.73 2.10 — 1.93	9 0.87 1.70 0.52 2.13	13 0.84 1.80 0.63 2.03		

*Note:*— \* In terms of Ammonium sulphate or equivalent.

\*\* In terms of single Superphosphate or equivalent.

*ANNEXURE 17.6*  
*Average yield of rice in quintals per hectare with sampling error in Alleppey district and in comparable areas*

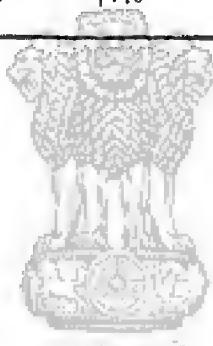
Crop	Year	Alleppey district					Control area					Average yield in comparable areas	
		Area in '00' hectares	Number of cuts	Average yield	S.E.	Area in '00' hectares	Number of cuts	Average yield	S.E.	Kerala State	Kerala State excluding Alleppey and Palghat		
1	2	3	4	5	6	7	8	9	10	11	12		
First crop <i>(viruthput)</i>	1959-62@	221	291	11.4		41	33	13.9	0.88	12.2	11.0		
	1962-63	221	11.7	0.40		41	47	11.1	0.69	12.5	11.9		
	1963-64	221	312	10.3	0.27	41	46	11.8	0.72	13.0	11.6		
	1964-65	220	251	9.6	0.31	42	41	12.3	0.43	12.5	11.0		
	1962-65@	221	854*	10.5		41	126*			12.7	11.5		
Second crop <i>(mundazhan)</i>	1959-62@	158	256	14.8		43	47	18.1	0.88	14.7	14.0		
	1962-63	179	260	12.5	0.38	43	50	15.7	0.68	14.6	13.8		
	1963-64	179	13.5	0.39		43	48	16.4	0.69	15.1	14.1		
	1964-65	176	224	14.1	0.33	43	45*	16.7	0.43	15.5	14.2		
	1962-65@	178	740*	13.4		43	145*			15.1	14.0		
Third crop <i>(panja)</i>	1959-62@	399	357	15.3		123	42	21.2	0.96	15.5	15.4		
	1962-63	423	428	16.4	0.28	123	49	17.6	0.63	15.1	15.1		
	1963-64	423	381	15.5	0.24	123	46	14.7	0.63	14.9	15.4		
	1964-65	422	381	17.0	0.30	123	137*	17.8	0.43	15.2	13.0		
	1962-65@	423	1166*	16.3		123				15.1	14.5		
Rice (Overall)	1959-62@	778	904	14.1	0.20	207	122	19.1	0.62	13.5	14.4		
	1962-63	823	1000	14.3		207	146	15.9	0.42	13.6	12.9		
	1963-64	823	836	13.7	0.16	208	140	14.3	0.39	14.0	12.9		
	1964-65	818	818	14.4	0.19	207	408*	16.3	0.27	13.8	12.6		
	1962-65@	821	2760*	14.1						13.8	12.8		

\* Pooled (not averaged) over three years period.  
 @ Average for the period of 3 years.

## ANNEXURE 17.7

*Production of rice (in '00' tonnes) in Alleppey district*

Year 1	First crop	Second crop	Third crop	Total 5
	2	3	4	
Average for 3 years 1959-62	252	234	609	1095
1962-63	259	224	694	1177
1963-64	228	242	656	1126
1964-65	211	248	717	1176
Average for 3 years 1962-65	233	238	689	1159
Percentage increase (+) or decrease (-) of average production of 1962-65 over 1959-62	For district	-7.5	+1.7	+13.3
	For State	+7.0	+8.4	+2.4
				+5.9
				+7.1



ANNEXURE 17.8

Percentage distribution of fields sampled in Alleppey district for different combinations of practices—Irrigation (I), Manures (M) and Fertilizer (F) and their average yields in quintals per hectare.

Practices followed	1962-63			1963-64			1964-65			Pooled over all years		
	No. of fields	% to the total	Avg. yield	No. of fields	% to the total	Avg. yield	No. of fields	% to the total	Avg. yield	No. of fields	% to the total	Avg. yield
1	2	3	4	5	6	7	8	9	10	11	12	13
O M F	31	27	13.0	46	35	10.4	47	32	10.8	124	32	11.2
O M O	64	57	8.6	65	49	8.8	74	51	8.6	203	52	8.7
O O F	5	4	16.1	2	1	*	2	1	*	9	2	16.5
O O O	13	12	12.8	20	15	14.0	23	16	9.6	56	14	11.9
Total	113	100	10.6	133	100	10.2	146	100	9.6	392	100	10.1
Rice ( <i>vinyapuu</i> )												
O M F	54	47	14.0	63	49	16.1	75	55	17.0	192	51	15.9
O M O	53	47	11.0	50	39	10.7	45	33	10.2	148	39	10.7
O O F	3	3	*	4	3	*	8	6	19.3	15	4	16.3
O O O	3	3	*	12	9	10.6	9	6	10.9	24	6	10.7
Total	113	100	12.4	129	100	13.4	137	100	14.5	379	100	13.5

ANNEXURE 17.8 (*Continued*)

	1	2	3	4	5	6	7	8	9	10	11	12	13
	Rice (pataja)												
I M F	33	16	21.1	41	15	16.9	9	3	18.8	83	11	18.8	—
I M O	3	1	*	4	2	*	0	0	0	7	1	—	—
I O F	35	16	22.5	49	18	15.6	4	1	13.2	88	11	18.2	—
I O O	6	3	20.1	5	2	20.5	0	0	—	11	1	20.2	—
Total	77	36	21.5	99	37	16.7	13	4	17.1	189	24	18.7	—
O M F	52	24	17.6	60	22	16.4	148	51	15.9	260	34	16.4	—
O M O	17	8	17.7	12	4	16.1	19	7	12.8	48	6	15.4	—
O O F	61	29	20.9	87	32	15.7	100	35	17.5	248	32	17.7	—
O O O	6	3	20.1	13	5	13.4	8	3	14.7	27	4	15.3	—
Total	136	64	19.2	172	63	15.8	275	96	16.2	583	76	16.8	—

\* Average yield has not been given for observations less than 5.

## ANNEXURE 17.9

*Average yield of rice in quintals per hectare in Alleppey district according to source of seed used.*

Crop	Source of Seed	Average yield			
		1962-63	1963-64	1964-65	Pooled
1	2	3	4	5	6
First crop (viruppu)	Own	10.9 (78)	10.2 (130)	9.9 (137)	10.2 (345)
	Cooperative societies/Govt.	—	—	—	—
	Others	9.1 (35)	10.0 (4)	6.2 (10)	8.6 (49)
Second crop (mundakan)	Own	12.9 (77)	13.1 (118)	14.3 (123)	13.5 (318)
	Cooperative societies/Govt.	15.3 (15)	17.2 (11)	13.8 (5)	15.7 (31)
	Others	9.2 (18)	—	17.3 (9)	11.9 (27)
Third crop (punja)	Own	20.1 (172)	16.3 (225)	15.9 (202)	17.9 (397)
	Cooperative societies/Govt.	—	15.7 (7)	17.3 (12)	15.7 (7)
	Others	19.6 (41)	15.4 (38)	17.0 (74)	17.6 (79)

Note : Figures in brackets indicate the number of observations.

## ANNEXURE 17.10

*Land Utilisation—Palghat (Kerala)*

(00 Hectares)

S. No.	Type of area according to use	1959-60	1960-61	1961-62	Average
1	2	3	4	5	6
1.	Geographical area	5104	5104	5104	5104
2.	Forest	996	996	996	996
3.	Barren and uncultivable land	289	285	281	285
4.	Land put to non-agricultural uses including homesteads, grave-yard, road, canal <sup>s</sup> , lakes etc.	613	613	615	614
5.	Cultivable waste	240	227	227	231
6.	Permanent pasture and other grass lands	63	63	63	63
7.	Land under miscellaneous tree crops and groves not included in the net area sown	283	302	302	296
8.	Current fallows	88	93	96	92
9.	Fallow land other than current fallows	120	107	107	111
10.	Net area sown	2412	2418	2417	2416
11.	Net area sown expressed as percentage of geographical area	47.2	47.4	47.4	47.3
12.	Area sown more than once	688	767	767	741
13.	Area sown more than once expressed as percentage of net area sown	28.5	31.7	31.7	30.7
14.	Gross cropped area	3100	3185	3184	3157

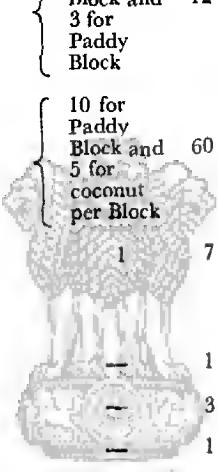
## ANNEXURE 17.11

*Estimates of Area and Production of Major Crops—Palghat (Kerala)*

Crop	Area (hectares)				Production (Metric tons)				Yield (Quintals per hectare)			
	1959-60	1960-61	1961-62	Average 1959-62	1959-60	1960-61	1961-62	Average 1959-62	1959-60	1960-61	1961-62	Average 1959-62
1	2	3	4	5	6	7	8	9	10	11	12	13
1. Rice	187003	192102	191193	190099	298602	304190	295528	299440	15.97	15.83	15.46	15.8
2. Jowar	1392	1392	1339	1374	599	599	579	592	4.30	4.30	4.32	4.3
3. Small Millets	4091	4083	4079	4084	2032	2022	2022	2025	4.97	4.95	4.96	5.0
4. Ragi	858	923	919	900	1351	1443	1433	1409	15.70	15.60	15.59	15.7
5. Total Cereals	193344	198500	197530	196457	302584	308254	299562	303466	15.65	15.53	15.17	15.4
6. Tur	4909	4895	4895	4900	2432	2422	2301	2385	4.95	4.95	4.70	4.9
7. Groundnut	12929	15390	15390	14570	12903	15118	13106	13709	9.98	9.82	8.52	9.4
8. Sesamum	1598	1598	1598	1598	436	436	434	435	2.73	2.73	2.72	2.7
9. Total oil seeds	14527	16983	16988	16168	13399	15554	13540	14144	9.18	9.16	7.97	8.7
10. Sugarcane (Gur)	562	563	563	563	2367	2367	2367	2367	42.12	42.04	42.04	42.0
11. Cotton	8195	7681	7385	7754	1449	1339	1303	1364	1.77	1.74	1.76	1.8

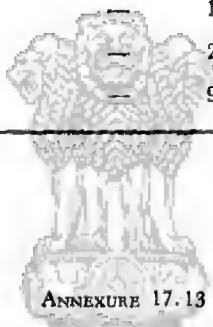
## ANNEXURE 17.12

*Additional staff sanctioned and in position for IADP Palghat*

S. No.	Category	Additional staff sanctioned			Additional staff in position			
		Per block	Total as on 30th June		Total as on 30th June	Total as on 30th June		
			1963	1964		1963	1964	
1	2	3	4	5	6	7	8	9
<b>A. Block Level:</b>								
1.	Agril. Extn. Officer	 1 for Coconut Block and 3 for Paddy Block	12	30	30	12	27	27
2.	Village Level Worker		60	165	165	39	151	152
3.	Coop. Extn. Officers		1	7	15	7	13	13
<b>B. District Level:</b>								
1.	Project Officer	—	1	1	1	1	1	1
2.	Subject-matter Specialist	—	3	4	4	2	4	4
3.	Dy. Registrar	—	1	1	1	1	1	1
4.	Marketing Officer	—	1	1	1	1	1	1
5.	Bank Inspector	—	4	8	8	4	8	8
<b>C. Agricultural Information:</b>								
1.	Agril. Information Officer	—	1	1	1	1	1	1
2.	Addl. Agril. Information Officer	—	1	1	1	1	1	1
3.	Photographer	—	1	1	1	1	1	1
4.	Artist	—	1	1	1	1	1	1
<b>D. Agricultural Implements Workshop:</b>								
1.	Asstt. Agril. Engineer	—	1	1	1	1	1	1
2.	Workshop Mechanic	—	—	—	—	—	—	—
3.	Artisan	—	—	—	—	—	—	—

## ANNEXURE 17.12 (Continued)

1	2	3	4	5	6	7	8	9
<b>E. Soil Testing Laboratory:</b>								
1. Asstt. Soil Chemist	—	1	1	1	—	1	1	
2. Research Asstt.	—	2	—	—	—	—	—	
3. Scientific Asstt.	—	4	—	—	—	—	—	
<b>F. Quality Seed Programme:</b>								
1. Seed Development Officer	—	—	1	1	—	1	—	
2. Seed Inspector	—	—	4	2	—	1	1	
<b>G. Benchmark Survey:</b>								
1. Statistical Officer	—	1	1	1	1	1	1	
2. Statistical Asstt.	—	2	2	2	2	2	2	
3. Investigator	—	9	9	9	9	9	9	



ANNEXURE 17.13

*Percentage area under various crops for different holdings size groups in Palghat district during 1962-63.*

Crop	Holding Size					
	Very small	Small	Medium	Large	Pooled	6
1	2	3	4	5		
Rice 1st crop ( <i>viruppu</i> )	31	36	38	39	38	
Rice 2nd crop ( <i>mundakan</i> )	28	36	36	34	34	
Coconut	17	11	7	5	7	
Other garden crops	15	5	5	6	6	
Others	9	12	14	16	15	
Total	100	100	100	100	100	

## Annexure 17.14.

*Percentage area under Rice crops benefited by different manures and fertilizers and their average rates of application during 1962-63—Pulghat District.*

Crop/kind of organic manure or chemical fertilizer	Percentage area benefited				Average rate of application in quintals per hectare					
	Holding size			Pooled	Holding size					
	Very small	Small	Medium		Large	Very small	Small	Medium	Large	Pooled
1	2	3	4	5	6	7	8	9	10	11
<i>First crop (viruppu)</i>										
F.Y.M. or compost	97	96	98	98	98	26	33	37	36	36
Nitrogenous Fertilizer (in terms of Ammon. sulphate)	3	9	25	33	27	1.93	1.46	1.43	0.96	1.09
Phosphatic fertilizer (in terms of Super phosphate)	—	—	—	4	2	—	—	—	0.07	0.07
Mixed fertilizer and/or complex fertilizers	7	18	26	34	29	0.79	0.84	1.11	0.96	1.01
<i>Second crop (mundaten)</i>										
F.Y.M. or compost	95	98	96	92	94	23	26	44	29	32
Nitrogenous fertilizer (in terms of Ammon. Sulphate)	3	13	29	54	41	0.77	1.61	1.95	2.27	2.17
Phosphatic fertilizer (in terms of Super phosphate)	—	1	1	7	5	—	0.96	0.25	0.49	0.49
Mixed fertilizers and/or complex fertilizers	7	24	36	50	42	1.38	1.24	0.99	0.84	0.91

**ANNEXURE 17.15**  
*Average yield of rice in quintals per hectare with sampling error in Palghat district and its control area.*

Crop	Year	Palghat district					Control area					Kerala State	
		Area in 00' hectares	No. of experi- ments	Average yield	S.E.	Area in 00' hectares	No. of experi- ments	Average yield	S.E.	Whole State	Average yield	Excluding Alleppey & Paithan	
1	2	3	4	5	6	7	8	9	10	11	12		
First crop (vriyppu)	Av. for 3 years (1959-62)	1186		14.8									
	1962-63	1161	415	14.1	0.20	149	64	13.4	0.63	12.2	11.0		
	1963-64	1156	431	16.0	0.26	145	66	15.0	0.59	12.5	11.9		
	1964-65	1155	350	16.4	0.32	145	66	14.5	0.50	13.0	11.6		
	Av. for 3 years (1962-65)	1157	1196@	15.5									
	Av. for 3 years (1959-62)	715		17.4									
Second crop (mundakan)	1962-63	784	418	17.6	0.25	135	55	15.1	0.65	14.7	14.0		
	1963-64	793	382	18.8	0.42	135	36	20.0	1.11	14.6	13.8		
	1964-65	791	353	19.8	0.34	135	51	15.2	0.95	15.1	14.1		
	Av. for 3 years (1962-65)	783	1153@	18.7									
	Av. for 3 years (1959-62)	1901		15.8									
	Rice (Overall)	1945	833	15.5	0.16	284	119	14.2	0.45	13.5	14.4		
Av. for 3 years (1962-65)	1949	813	17.1	0.33		280	102	17.4	0.61	13.6	12.9		
	1946	703	17.8	0.23		280	117	14.8	0.54	14.0	12.9		
	1947	2349@	16.8							333@	15.5	12.6	
											13.9	12.8	

## ANNEXURE 17.16

*Production of rice in '00' tonnes in the IADP district—Palghat*

Year		1st crop	2nd crop	Total
Average for 3 years	1959-62	1751	1244	2995
	1962-63	1637	1380	3017
	1963-64	1850	1491	3341
	1964-65	1894	1566	3460
Average for 3 years	1962-65	1794	1479	3273
Percentage increase (+) or decrease (—) of Average production of 1962-65 over 1959-62	District	(+) 2.5	(+) 18.9	(+) 9.3
	State	(+) 7.0	(+) 7.2	(+) 7.1

## ANNEXURE 17.17

*Average yield of rice in quintals per hectare separately for participant and non-participant cultivators — Palghat.*

Crop	Year	Percentage of participants	Average yield	
			Participant	Non- participant
1	2	3	4	5
First crop <i>(viruppu)</i>	1962-63	9	17.1	13.8
	1963-64	25	17.7	15.1
	1964-65	35	18.8	14.5
Second crop <i>(mundakan)</i>	1962-63	12	20.0	17.0
	1963-64	30	22.0	16.4
	1964-65	30	23.5	18.3

ANNEXURE 17.18

*Percentage distribution of fields sampled in Palghat district for different combinations of practices—Irrigation (I), Manure (M), and Fertilizer (F) and their average yields in quintals per hectare.*

Practices followed	1962-63			1963-64			1964-65			Pooled over all the years		
	No. of fields*	% to the total	Av. yield	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield
I M F	29	12	17.0	41	15	20.4	48	18	20.0	118	15	19.4
I M O	40	16	14.1	45	17	17.3	33	12	19.6	118	15	16.9
I O F	0	0	—	—	—	—	—	—	—	—	—	—
I O O	2	1	*	—	—	—	—	—	—	2	—	*
Total	71	29	15.2	86	32	18.8	81	30	19.8	238	30	18.1
O M F	22	9	15.1	32	12	15.6	44	17	17.4	98	13	16.3
O M O	149	61	13.4	150	55	14.0	141	52	13.3	440	56	13.6
O O F	0	0	—	1	—	—	1	—	23.4	2	—	*
O O O	2	1	*	3	1	*	3	1	15.5	8	1	15.1
Total	173	71	13.6	186	68	14.3	189	70	14.4	548	70	14.1

ANNEXURE 17.18 (Continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13
	Rice 2nd crop (mundakan)												
I M F	78	30	20.3	78	31	24.1	85	32	25.9	241	31	23.7	
I M O	31	12	17.9	28	11	17.3	11	4	14.4	70	9	17.1	
I O F	6	3	*	2	1	*	9	3	27.8	17	2	22.0	
I O O	3	1	*	2	1	*	—	—	—	5	1	20.8	
Total	118	46	20.0	110	44	22.0	105	39	24.9	333	43	22.2	
O M F	29	11	17.3	31	12	19.5	53	20	21.3	113	15	19.8	
O M O	105	41	14.4	102	41	13.5	108	40	15.4	315	40	14.4	
O O F	3	1	*	4	2	*	1	—	14.1	8	1	14.1	
O O O	3	1	*	4	1	*	2	1	7.7	9	1	7.7	
Total	140	54	15.0	141	56	14.9	164	61	17.2	445	57	15.7	

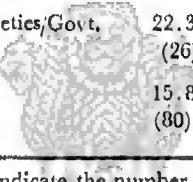
\* For less than 5 observations, average yield has not been given.

## ANNEXURE 17.19

*Average yield of rice in quintals per hectare according to source of seed used—Palghat*

Crop	Source of seed	Average yield			
		1962-63	1963-64	1964-65	Pooled
First crop (viruppu)	Own	14.1 (106)	16.1 (146)	15.9 (179)	15.5 (431)
	Cooperative societies/Govt.	17.2 (14)	18.0 (10)	21.8 (19)	19.4 (43)
	Others	11.9 (79)	14.1 (69)	15.0 (72)	13.6 (220)
Second crop (mundakan)	Own	17.3 (152)	16.9 (201)	18.2 (158)	17.4 (511)
	Cooperative societies/Govt.	22.3 (26)	23.0 (25)	24.9 (45)	23.7 (96)
	Others	15.8 (80)	22.2 (25)	20.1 (66)	18.3 (171)

*Note:* Figures in brackets indicate the number of observations.



ભારત સરકાર

## CHAPTER XVIII

### MANDYA (MYSORE)

#### I

18.1 Mandya District is situated in the southern part of Mysore State. It covers a total area of about 4,745 square kilometres and comprises seven talukas divided into  $10\frac{1}{4}$  community development blocks, having 1,329 villages. The total population, according to 1961 census, is 8.99 lakhs of which 89 per cent is classified as rural. The density of population is 189 per square kilometre. The length of roads serving the district, including that of the village roads, is about 3,566 kilometres. The distance covered by the railway line in the district is 64 kilometres. The metre-gauge railway which is the main line between Bangalore and Mysore passes through the taluk headquarters of Maddur, Mandya, Pandavapura and Srirangapatnam.

18.2 The normal average rainfall in the district ranges between 65 to 70 cm. and the number of rainy days is 65, the rain being mostly received during May to October. The soils are mostly derived from granites interspersed with occasional patches of schists. Soils range from red gravelly and red sandy to red clay loams, shallow in higher elevations and comparatively deep in valley portions. Water-holding capacity of the soils is very poor. Most soils of the district are neutral in reaction with a tendency to develop alkalinity under restricted drainage conditions.

#### *Land Utilisation*

18.3 During the period 1959-60 to 1961-62, the net sown area averaged about 2.46 lakh hectares comprising 52 per cent of the total geographical area. Approximately 6.57 per cent of the net sown area was double cropped making the gross cropped area 2.62 lakh hectares. About 28 per cent of the net area sown and 36 per cent of the gross cropped area was irrigated. The Visweswaraiah Canal irrigates more than 80 per cent of the irrigated tracts of the district. The other sources of irrigation are tanks, wells and private canals. Annexure 18.1 gives land utilisation data for the three years ending 1961-62.

#### *Cropping Pattern*

18.4 In the irrigated tracts, paddy is the main cereal crop accounting for about 22 per cent of the gross cropped area. In the rainfed region, ragi is the main crop covering 28 per cent of the gross cropped area. The rest of the area is shared by a variety of crops, the more important being sugar-

cane, groundnut and sesamum mixed with sorghum. Green manure crops constitute the subsidiary crops after paddy in the irrigated tract. Summer paddy is raised to a limited extent in low lying reaches. In the rainfed regions, horse-gram, niger, sesamum and sorghum are the other subsidiary crops. Annexure 18.2 shows the area and yield per hectare of food grains and major commercial crops before the launching of the Package Programme.

#### *Land Tenure*

18.5 The religious and charitable *Inams* have been abolished and their tenants brought into direct relationship with the State and conferred permanent and heritable rights. They have also an option right to purchase ownership. Legislation for the abolition of personal and miscellaneous *Inams* has been enacted and implemented. Tenants will have permanent and heritable rights but in some cases they have not been brought into direct relationship with the State.

18.6 Pending enforcement of the Mysore Land Reforms Act which aims at removing the wide disparities in the existing tenancy laws, the provisions of the various existing tenancy laws regarding the rights of landlords vis-a-vis tenants, of resumption and purchase of ownership rights have been stayed and the tenancies extended.

18.7 The Mysore Land Reforms Act provides for two classes of tenants: (i) permanent tenants who have been recognised and recorded as such or who hold lease permanently; and (ii) protected tenants who have held land for 12 years from the same landlord in the same village and include tenants deemed to be protected tenants under existing laws.

#### *Administrative Arrangements*

18.8 The overall charge of the programme rests with the Deputy Commissioner of the district. He is assisted by the Dy. Director of Agriculture, also called the Project Officer. On the cooperative side the Dy. Commissioner is assisted by a Dy. Registrar of Cooperative Societies and one Assistant Registrar. The other personnel at the district level include Subject-matter Specialists in Agronomy, Soil Science, Plant Protection, Water use and Farm Management, besides Agricultural Engineer, Agricultural Information Officer, Asstt. Project Officer and Seed Development Officer. The normal staff existing at the district level, both in agriculture and cooperative sectors, is fully associated with the package programme.

18.9 At the sub-divisional level, 2 additional District Agricultural Officers are sanctioned for the IADP. At the block level, the Block Development Officers are the coordinating officers assisted by the additional staff of 10 Village Level Workers, 4 Agricultural Extension Officers, one Cooperative Extension Officer and one Cooperative Supervisor.

18.10 Annexure 18.3 shows the position in respect of the appointment of additional staff. Coordination Committees, both at the State and District levels, have been set up. The Chairman of the Coordination Committee at the State level is the Minister for Agriculture and at the District level, the Dy. Commissioner.

18.11 Zila Parishad, as is obtaining in other districts of the State, has not yet been constituted but the District Development Council presided over by the Dy. Commissioner reviews the progress of the programme periodically.

#### *Coverage*

18.12 The programme was launched in kharif 1962-63 in 320 villages spread over 9½ blocks. During the next year (1963-64), 638 villages were covered in all the 10½ community development blocks. During 1964-65, the programme was extended to all the 1329 villages. The cultivated area covered by the programme has increased from 0.36 lakh hectares in 1962-63 to 0.78 lakh hectares in 1963-64 and to 0.92 lakh hectares in 1964-65 representing 14 per cent, 30 per cent and 35 per cent respectively of the gross cropped area in the blocks. The main crops covered under the programme are rice, ragi, groundnut, pulses and vegetables. Nearly 80 per cent of the area under paddy and ragi has been covered and necessary steps have been taken to cover sugarcane crop.

18.13 The number of farm plans prepared has increased from 24,945 in 1962-63 to 63,204 in 1963-64, and to 67,045 in 1964-65 representing 18, 45 and 48 per cent of the total number of cultivating families in the district.

#### *Fertilizers*

18.14 The offtake of nitrogenous fertilizers has increased by 174 per cent between the pre-package year 1961-62 and 1963-64 and that of phosphatic fertilizers by 220 per cent during the same period. In terms of per hectare application, there was an increase from 44.16 kg. in 1961-62 to 115.58 kg. in 1963-64 in case of nitrogenous fertilizers and from 19.73 kg. to 66.66 kg. in the case of phosphatic fertilizers. There was, however, a drop in fertilizer offtake during 1964-65 mainly due to the unsatisfactory supply position in respect of certain specific type of fertilizers for which farmers showed preference over others. The table below shows the growth in the offtake of chemical fertilizers :

*Total Distribution in Tonnes*

Year	Nitrogenous (in terms of Ammon. sulphate)	Phosphatic (in terms of Super phosphate)
1961-62	15,280	6813
1962-63	27,115	10,900
1963-64	41,939	21,865
1964-65	38,138	12,317

18.15 The offtake of potassic fertilisers (Muriate of Potash) has received a fillip with the advent of the package programme, the quantity distributed having increased from 500 tonnes in 1962-63 to 747 tonnes in 1963-64 and to 888 tonnes in 1964-65.

18.16 In addition to the seven taluk agricultural produce marketing societies which handle the distribution of fertilizers at the wholesale level, there were 302 service cooperatives handling the retail distribution during 1964-65, as against 266 societies in 1962-63 and 257 societies in 1961-62.

#### *Improved Seeds*

18.17 The Quality Seed Programme envisages the coverage of 25 per cent of the area of the district each year. Under this programme, an incentive subsidy of Rs. 4 per quintal over the market rate is being paid to the registered seed growers while the marketing societies are being given Rs. 1.25 per quintal for handling charges. The quantity of improved seeds distributed increased from 55 tonnes in the pre-package year 1961-62 to 135 tonnes in 1963-64. This again increased to 183 tonnes during the year 1964-65. The area covered by improved seeds marked a rise from 1,123 hectares in the year 1961-62 to 6,600 hectares in 1963-64. It rose to 7,712 hectares during 1964-65.

#### *Pesticides & Plant Protection*

18.18 The plant protection programme consists essentially of prophylactic measures against incidence of pests and diseases and is concentrated largely on the two major crops of paddy and ragi. Due to lack of rigidity in the calendar of cultivation programme and indiscriminate use of nitrogenous fertilisers, both as basal and top dressing, the stem borer pest and blast are endemic in certain areas of the district. During the year 1963-64, an area of 2567 hectares was treated against pests and diseases while during the year 1964-65 the area covered by plant protection measures stood at 6072 hectares. The pesticide formulations used, registered a rise from 4 tonnes in the year 1961-62 to 8 tonnes in 1963-64 and 10.6 tonnes in 1964-65. As against only 6 tonnes of seeds treated during the year 1962-63, the quantity treated during 1963-64 was 146 tonnes and that during the year 1964-65 stood at 201 tonnes.

18.19 Insecticides and fungicides are stocked by taluk marketing societies and are made available to service cooperative societies for distribution. Service cooperatives are also being encouraged to stock fungicides, insecticides, and weedicides well in advance of the season for distribution among the ryots.

#### *Improved Implements*

18.20 An implements workshop is being established in the district to give a fillip to the production, popularisation and demonstration of

improved implements. The construction of the building is in progress. Besides testing and developing improved implements suited to local conditions the workshop will undertake manufacture of prototypes and train village artisans and farmers in the repair and maintenance of implements. In the meantime a training class was conducted in January, 1964 for village artisans and extension workers in the proper use of improved implements.

#### *Demonstration*

18.21 Demonstrations, mainly of composite type, are being laid on cultivators' fields to show the benefits of the adoption of package of practices. The number of demonstrations laid during 1963-64 and 1964-65 was 1014 and 979 respectively.

The results of these demonstrations have shown that during kharif 1964-65 the average yield on demonstration as compared to 'control' plots was 29 per cent higher in case of paddy. The increases obtained during the preceding year was 23 per cent in the case of paddy and 40 per cent in case of ragi. The economics of the paddy demonstrations during 1964-65 shows a return of Rs. 5.93 for each additional rupee spent on the package of practices

#### *Soil Testing*

18.22 No soil testing laboratory has been set up at Mandya, but the existing laboratory at Bangalore has been strengthened with additional staff to handle about 30,000 soil samples annually. As against 4,698 samples tested, only 670 recommendations were made on the basis of soil tests during the year 1962-63; the number of samples tested and recommendations made during 1964-65 were 9,165 and 10,421 respectively.

#### *Cooperative Credit and Marketing*

18.23 The number of primary credit societies increased from 292 in 1961-62 to 308 in 1963-64 and further to 396 in 1964-65. The membership of these societies increased from 0.70 lakhs in 1961-62 to 0.78 lakh in 1963-64 and to 0.92 lakh in 1964-65. The share capital rose from Rs. 23.58 lakhs in 1961-62 to Rs. 29.76 lakhs in 1963-64 and then dropped to Rs. 28.00 lakhs in 1964-65. The loans advanced by these societies witnessed a fall from Rs. 86.57 lakhs in 1961-62 to Rs. 83.81 lakhs in 1963-64 and then increased to Rs. 84.36 lakhs in 1964-65. The overdues of the societies mounted up from 13.6 per cent in 1962-63 to 53.4 per cent in 1963-64; but during the year 1964-65, these have been reduced to 33 per cent. The percentage of villages covered increased from 92 in 1961-62 to 95 in 1962-63 and to 98 in 1964-65 while that of agricultural population covered went up from 47 to 54 and 76 respectively.

18.24 In addition to cooperative loans, the State Government issued

*taccavi* loans to the tune of Rs. 0.75 lakh during each of the years 1961-62 to 1963-64.

18.25 The membership of the Central Cooperative Bank in the district declined from 413 in 1961-62 to 410 in 1962-63 and increased to 432 in 1963-64 and to 459 in 1964-65. Its share capital increased from Rs. 21.17 lakhs in 1961-62 to Rs. 35.19 lakhs in 1963-64 and to Rs. 36.74 lakhs in 1964-65. The working capital came down from Rs. 177.28 lakhs in 1961-62 to Rs. 130.98 lakhs in 1962-63 and then increased to Rs. 218.14 lakhs in 1964-65. However, the loans advanced by the Central Bank did not show any expansion during the period; such loans amounted to Rs. 86.53 lakhs in 1961-62 and Rs. 85.56 lakhs in 1964-65.

18.26 Attempts have been made to issue loans on the basis of seasonality. For the main crops, the loans are issued during March-May and recovered at the harvest time in February-March. In normal course, a member could borrow short term loan upto a limit of Rs. 250 on personal surety. During the year 1961-62 this limit was raised to Rs. 500 and it was further raised to Rs. 750 during 1963-64. The loans are disbursed in kind and cash in the ratio of approximately 60:40.

18.27 The number of marketing societies has remained unchanged at 7 during the years 1961-62 to 1964-65 though their membership has increased from 5503 in 1961-62 to 5815 in 1963-64 and to 5884 in 1964-65. The share capital has also gone up from Rs. 7.56 lakhs in 1961-62 to Rs. 10.52 lakhs in 1963-64 and further increased to Rs. 20.97 lakhs in 1964-65. These societies marketed agricultural produce valued at Rs. 34.67 lakhs during 1964-65 as against Rs. 6.77 lakhs worth of produce marketed in 1961-62. The advent of the package programme has not only resulted in a consistent improvement in the business of marketing societies but has also contributed to a diversification in their activities. All the marketing societies have taken up distribution of chemical fertilizers and improved seeds. The *Ryots Agricultural Produce Cooperative Marketing Society*, Mandya, has also taken up the manufacture of improved agricultural implements and established a fully equipped workshop. It has also established a manure mixing plant and taken up the processing of oilseeds. The four taluk agricultural produce cooperative marketing societies have taken up the processing of paddy.

#### *Storage Godowns*

18.28 As against 521 godowns needed to saturate the district, 59 godowns were already existing in June, 1964 while 57 were under construction, 36 had been taken up and 369 godowns remained to be sanctioned. During the year 1964-65, 59 godowns were added to the number existing as in June, 1964 bringing the total number of godowns completed to 118 while 27 godowns were under constructions and on 40 godowns, work was yet to start.

## II

*Results of Agronomic and Agro-economic survey, 1962-63*

18.29 Agronomic and agro-economic survey was initiated in the year 1962-63 in the district and three control blocks namely Chamrajanagar, T. Narasipur, and K.R. Nagar in Mysore district and since then it is being repeated annually. In that year, about 800 holdings in the district and 384 holdings in the control blocks at the rate of 8 cultivators per village were randomly selected for enquiry.

*Holding Size:*

18.30 The sampled cultivators were classified in four groups according to the size of their holdings. The proportion of cultivators falling in the four groups, the area cultivated by them and the average sizes of holdings were obtained and these are given in the table below :

	HOLDING SIZE			
	Very small (upto 1 hectare)	Small (1-2 hectares)	Medium (2-4 hectares)	Large (above 4 hectares)
Percentage of the cultivators in the group to the total	10	25	37	28
Average size in hectares	0.67	1.49	2.95	6.92
Percentage of cultivated area for the group to the total	2	12	30	56

About one-fourth of the cultivators had holdings exceeding 4 hectares which accounted for about 56 per cent of the cultivated area. Proportion of cultivators having medium size holdings was highest being 37 per cent compared to other holdings and they cultivated 30 per cent of the area. Remaining 35 per cent of the cultivators had holdings less than 2 hectares in size and their share was about 14 per cent of the area. The average size of holding in the district was estimated as 3.4 hectares.

*Cropping pattern*

18.31 The cropping pattern followed by the cultivators in the different holding size groups is presented in Annexure 18.4. It would be observed that paddy, ragi, pulses and sugarcane—the principal crops of the district—accounted for about 75 per cent of the gross cropped area. The crop-

ping pattern adopted in different size groups showed that the percentage of the gross cropped area under foodgrain crops decreased with increase in the holding size, being 92 per cent in the very small holdings and 86 per cent in large size holdings. This was largely due to relatively smaller proportion of area under paddy and ragi crops in the large holdings. The area under cash crops increased with holding size.

#### *Distribution of production supplies*

18.32 Nitrogenous and phosphatic fertilizers were the chief items of production supplies received by the cultivators. Small proportion of the cultivators also availed of the supplies of potassic fertilizers. The supplies of nitrogenous and phosphatic fertilizers were availed of by 58 per cent and 41 per cent of the cultivators. It was observed that cultivators of large size holdings took relatively more advantage of these fertilizers. The average quantity of nitrogenous fertilizer availed of by a cultivator increased with the holding size, being 100 kg. in case of very small size holdings and 380 kg. for large size holdings. The average quantity of phosphatic fertilizer taken by a cultivator also increased with the holding size.

18.33 Seeds of paddy, ragi and pulses were availed of by a small percentage of cultivators. Cultivators having small size holdings were availing of the supply of paddy seeds in greater quantities than those of other holdings.

18.34 The facilities for the supply of production requisites like improved seeds and fertilizers were available in about 90 per cent of the villages either inside the village or in its neighbourhood. Supplies of plant protection chemicals were available in about 30 per cent of the villages. Cooperative societies or Government were the main agencies for distribution of chemical fertilizer and plant protection chemicals.

18.35 The facility for storage of farm produce was available in about 40 per cent of the villages either inside the village or in its neighbourhood. About 50 per cent of the villages had marketing facilities for disposing of their foodgrain surplus. Marketing of the agricultural surplus was mainly done through private agencies.

#### *Use of fertilizers and manures*

18.36 Chemical fertilizers were mostly applied to paddy, sugarcane and ragi crops in the district. Total quantity of nitrogenous fertilizers distributed in the district during 1962-63 was of the order of 27,115 tonnes. Of these, about 72 per cent was applied to paddy crop. Sugarcane and ragi respectively, accounted for about 9 per cent and 4 per cent of the total consumption of this fertilizer in the district. About 10,900 tonnes of phosphatic fertilizer was distributed in the district. About 63 per cent

of this fertilizer was applied to paddy crop and the remaining quantity was mostly consumed by sugarcane and ragi crops. The quantity of potassic fertilizer distributed was of the order of 500 tonnes. It was consumed by paddy and sugarcane crops.

18.37 Fertilizers were mostly applied in conjunction with organic manure. The practice of applying green manuring was very common in the district. About 30 per cent of the farmers were found using this manure.

*Percentage area benefited and average rate of application*

18.38 Percentage area benefited by nitrogenous fertilizer was of the order of 65 per cent under paddy, 93 per cent under sugarcane and 8 per cent under ragi crops. This fertilizer was equally popular among farmers of different holding size groups. (Annexure 18.5).

18.39 The average rates of application of nitrogenous fertilizer were 157 kg. per hectare for paddy, 587 kg. per hectare for sugarcane and 73 kg. per hectare for ragi crops. The rates of application were almost equal to the recommended rates of application for paddy (164 kg. per hectare) and ragi (84 kg. per hectare) and was about 46 per cent of the recommended rate for sugarcane (1261 kg. per hectare).

18.40 Percentage area benefited by phosphatic fertilizers under paddy, sugarcane and ragi crops were of the order of 56 per cent, 88 per cent and 8 per cent respectively. Average rates of application of this fertilizer to paddy, sugarcane and ragi crops were 149 kg., 430 kg. and 83 kg. per hectare respectively. These rates of application were much less than the recommended rates (207 kg. per hectare for paddy, 521 kg. per hectare for sugarcane and 131 kg. per hectare for ragi).

18.41 Percentage area benefited by potassic fertilizer to paddy and sugarcane crops were of the order of 5 and 3 respectively.

18.42 Almost the entire area was treated with organic manure under all the crops. The practice of green manuring was very popular in paddy crop. About 33 per cent of the area under paddy was benefited by green manure.

### III

*Results of crop-cutting survey conducted during 1962-65*

18.43 Crop-cutting survey was initiated in the district and the control blocks in 1962-63 on three principal crops, namely, paddy, ragi and sugarcane and since then the survey is being repeated annually. These crops covered about 55 per cent of the gross cropped area in the district.

The results of the survey conducted during the years 1962-65 are presented in Annexures 18.6 to 18.10.

18.44 It may be seen from Annexures 18.6 and 18.7 that both the yield rates as well as the total production of all the three crops increased during the period 1962-65 as compared to the yields for the period 1959-62. The increase in yield rate was more perceptible in case of paddy crop in the district. There was also increase in the yield rates and production of paddy and ragi in the adjoining districts as well as in the State as a whole (excluding the IADP district), but these were, however, of smaller order.

#### *Participants versus non-participants*

18.45 Results presented in Annexure 18.8 indicated that the proportion of fields of participant cultivators steadily increased from year to year (from 9 per cent in 1962-63 to 51 per cent in 1964-65 in case of paddy crop and 7 per cent in 1962-63 to 30 per cent in 1964-65 for ragi crop). For sugarcane crop, the proportion of fields of the participant cultivators was of the order of 50 per cent.

18.46 A comparison of yield rates obtained by participant and non-participant cultivators in various years indicated that the fields of participant cultivators gave higher yield as compared to those of non-participant cultivators in respect of all the crops covered by the crop-cutting survey. During 1964-65, fields of participant cultivators gave higher yields of 5.3 quintals, 3.9 quintals and 13.3 quintals of rice, ragi and sugarcane respectively per hectare.

#### *Agronomic practices*

18.47 In the district, paddy and sugarcane are largely grown under irrigated conditions while cultivation of ragi is mainly depended on monsoon rains. It may be seen from Annexure 18.9 that in case of paddy and ragi crops, the fields treated with chemical fertilizer gave consistently higher yields as compared to untreated fields in all the three years. On an average, the fertilized fields gave additional yield of 7.3 quintals of rice per hectare and 4.3 quintals of ragi per hectare. As these results are based on survey data, increases in the yield rates observed may not be wholly ascribed to fertilizer application. Since most of the fields growing sugarcane received the benefits of fertilizer application, such comparison was not possible.

18.48 There was a satisfactory progress in the adoption of improved seeds of paddy and sugarcane. Proportion of fields sown with improved seeds rose from 50 per cent in 1962-63 to 64 per cent in 1964-65 for paddy crop and from 83 per cent in 1962-63 to 92 per cent in 1964-65 for sugarcane crop. Popular improved strains were S-1092 and S-701 for paddy crop

and C.O.-419 for sugarcane crop. In case of ragi crop, over 90 per cent of the fields in all the years were sown with local seeds. Fields sown with improved seeds gave generally higher yields as compared to those sown with local seeds.

18.49 Proportion of fields sown with improved strains obtained from Government sponsored agencies rose from 13 per cent in 1962-63 to 21 per cent in 1964-65 in case of paddy crop. The yield rates of the improved seeds of paddy distributed through the Government sponsored agencies were higher to those obtained through other non-institutional sources during 1963-64 and 1964-65 (Annexure 18.10). The programme of distribution of improved seeds of ragi and sugarcane through Government sponsored agencies does not appear to have made any appreciable progress in the district.

18.50 During 1962-63, no plant protection chemicals were used. Proportions of fields treated during 1964-65 with plant protection chemicals were 5 per cent, 2 per cent and 1 per cent for paddy, ragi and sugarcane respectively.



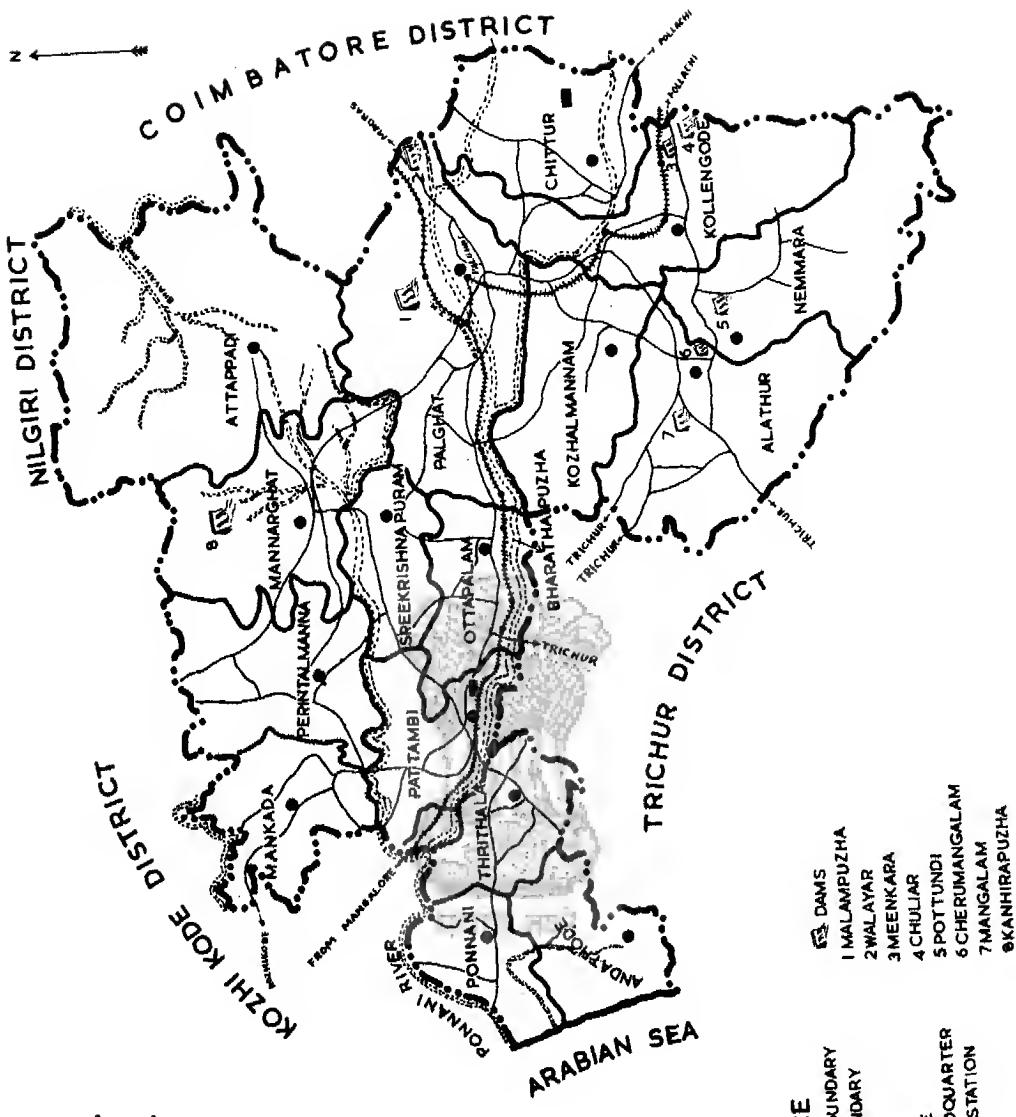
## ANNEXURE 18.1

*Land Utilisation and Irrigation : District Mandyā (Mysore)*

(00 hectares)

Sl. No.	Type of area according to use.	1959-60	1960-61	1961-62	Average of 3 years 1959-62
1.	Geographical area (according to village papers)	4729	4746	4761	4745
2.	Forest	170	170	170	170
3.	Barren and uncultivable land	189	189	165	181
4.	Land put to non-agricultural uses including home steads, grave yard, road, canals, lakes etc.	339	339	337	338
5.	Cultivable waste	544	548	509	534
6.	Permanent pasture and other grass lands	741	741	743	742
7.	Land under miscellaneous tree crops and groves not included in the net area sown	8	8	8	8
8.	Current fallows	225	270	294	263
9.	Fallow land other than current fallows	75	75	14	55
10.	Net area sown	2438	2406	2521	2455
11.	Net area sown expressed as per cent of geographical area	52	51	53	52
12.	Area sown more than once	145	144	195	161
13.	Area sown more than once expressed as per cent of net area sown	6	6	8	7
14.	Gross cropped area	2583	2550	2716	2616
15.	Net irrigated area	659	695	739	698
16.	Area irrigated more than once	227	226	277	243
17.	Gross irrigated area	886	921	1016	941
18.	Net irrigated area expressed as per cent of net area sown	27	29	29	28
19.	Gross irrigated area expressed as per cent of gross cropped area	34	36	37	36

# DISTRICT PALGHAT KERALA



## REFERENCE

- DISTRICT BOUNDARY
- BLOCK BOUNDARY
- RIVER
- ROAD
- RAILWAY LINE
- BLOCK HEADQUARTER
- RESEARCH STATION
- SEARCH STATION
- DAMS
- 1 MALAMPUZHA
- 2 WALAYAR
- 3 MEENKARA
- 4 CHULIAR
- 5 POTTUNDI
- 6 CHERUMANGALAM
- 7 MANGALAM
- 8 KANCHIRAPUZHA

ANNEXURE 18.2

*Estimates of Area, Production and yield of Major Crops—Mandyā (Mysore)*

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Crop	Area (Hectares)					Production (Tonnes)					Yield (Quintals per hectare)		
	1959-60	1960-61	1961-62	Average	1959-60	1960-61	1961-62	Average	1959-60	1960-61	1961-62	Average	
1	2	3	4	5	6	7	8	9	10	11	12	13	
1. Rice	56335	55844	64362	58347	68583	86301	106771	87885	12.17	15.81	16.59	14.93	
2. Jowar	11534	11462	12284	11160	1595	2935	7073	3868	1.38	2.56	5.76	3.29	
3. Bajra	1512	1736	1659	1636	330	567	298	398	2.18	3.27	1.80	2.44	
4. Ragi	69126	68936	81411	73158	63226	46829	58944	56333	9.15	6.79	7.24	7.70	
5. Small Millets	15791	11529	10343	12554	3503	2159	3135	2932	2.22	1.87	3.03	2.34	
6. Total Cereals	154298	149507	170059	157855	137237	140791	176221	151416	8.89	9.42	10.36	9.59	
7. Gram	403	730	127	420	55	140	56	84	1.36	1.92	4.41	1.99	
8. Tur	2113	2583	4241	2979	675	772	1449	965	3.19	2.99	3.42	3.24	
9. Groundnut	8113	6588	6277	6993	3523	2582	2252	2786	4.34	3.92	3.59	3.98	
10. Sesamum	2726	2807	3235	2923	502	499	978	660	1.84	1.78	3.02	2.26	
11. Castor	3380	3509	3026	3305	796	849	671	772	2.36	2.42	2.22	2.34	
12. Total Oil seeds	14219	12904	12538	13220	4823	3930	3901	4218	3.39	3.05	3.11	3.19	
13. Sugarcane	10439	11089	12682	11403	1006680	1016906	1225058	1082981	964.35	917.04	965.98	949.62	
14. Cotton	26	26	4	19	16	27	2	15	6.15	10.38	5.00	8.06	

(1) The information relating to Area, Production and Average yield are fully revised figures. The figures relating to 1961-62 are from the tables of Agricultural Statistics and Season and Crop Report.

(2) Crop estimation survey results for estimating total production with an allowance for bund correction has been adopted in respect of the following crops: Rice, Ragi, Sugarcane.

(3) Production estimates furnished in the statement for different crops are in terms of dry grains. (a) Sugarcane—in terms of stripped cane. (b) Rice—in terms of cleaned rice. (c) Groundnut—in terms of nuts in shell. (d) Cotton—in terms of lint cotton of bales of 180 kg. each.

## ANNEXURE 18.3

*Additional Staff sanctioned and in position for IADP in Mandyā (Mysore)*

Sl. No.	Category	Additional staff sanctioned Per block Total as on 30th June			Additional staff in position on 30th June			
		1963	1964	1965	1963	1964	1965	
1	2	3	4	5	6	7	8	9
<b>A. Block Level:</b>								
1. Agril. Extn. Officer		—	31	49	—	27	45	
2. Village Level Worker	4/10	40	100	200	38	92	193	
3. Coop. Extn. Officer	1	—	10	19	—	10	19	
4. Coop. Supervisor	1	—	10	10	—	10	10	
<b>B. District Level:</b>								
1. Project Officer		—	1	1	1	1	1	
2. Subject-matter Specialist		—	2	5	5	5	2	
3. Distt. Agril. Officer		—	—	2	2	—	1	
4. Dy. Registrar (Coop.)		—	1	1	1	1	1	
5. Asstt. Registrar ( -do- )		—	1	1	1	1	1	
6. Marketing Inspector		—	—	1	1	—	1	
<b>C. Agricultural Information Unit:</b>								
1. Agril. Informn. Officer		—	—	1	1	—	—	
2. Asstt. Agril. Informn. Officer		—	—	1	1	—	1	
3. Photographer		—	—	1	1	—	1	
4. Artist		—	—	1	1	—	1	
5. Press Operator		—	—	1	—	—	1	
<b>D. Agricultural Implements Workshop:</b>								
1. Agril. Engineer (Deputy)		—	—	1	1	—	1	1*
2. Asstt. Agril. Engineer		—	1	1	1	—	—	1
3. Workshop Mechanic		—	—	2	2	—	1	1
4. Artisan (Fertilizers/Black Smiths)		—	—	4	4	—	3	4

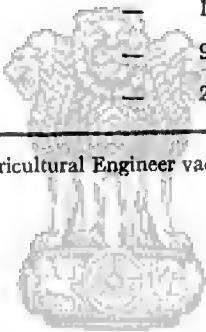


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ANNEXURE 18.3 (*Continued*)

1	2	3	4	5	6	7	8	9
<b>E. Soil Testing Laboratory :</b>								
1.	Asstt. Soil Chemist	—	—	1	1	—	1	1
2.	Research Assistant	—	—	2	2	—	2	2
3.	Scientific Assistant	—	—	1	1	—	1	1
<b>F. Quality Seed Programme :</b>								
1.	Seed Development Officer	—	1	1	—	—	—	—
2.	Seed Inspector	—	3	3	3	—	3	3
<b>G. Benchmark Survey :</b>								
1.	Statistical Officer	—	1	1	1	1	1	1
2.	Statistical Supervisor (Assistant)	—	2	2	2	2	2	2
3.	Statistical Supervisor	—	1	1	1	1	1	1
4.	Investigator	—	9	9	9	9	9	9
5.	Computer	—	2	2	2	2	2	2

\* Post of Deputy Agricultural Engineer vacant since 14-8-1964.



## ANNEXURE 18.4

*Percentage area under different crops for different holding size groups in Mandya district during 1962-63*

Name of crop	Very small holdings	Small holdings	Medium holdings	Large holdings	Pooled over all holdings
1	2	3	4	5	6
Paddy	33	25	20	24	23
Paddy (spring-summer)	6	5	2	4	4
Ragi	29	25	27	25	25
Cereals	4	6	8	6	6
Pulses	12	15	19	18	18
Cereals + Pulses (Mixture)	8	13	13	9	11
Total foodgrains	92	89	89	86	87
Sugarcane	2	3	2	5	4
Cash crops	1	3	4	4	4
Tree & fruit crops	*	2	1	1	1
Others	5	3	4	4	4
Total—all crops	100	100	100	100	100

\* Indicates that percentage is less than 0.5

## ANNEXURE 18.5

*Percentage area under the various crops in Mandya district benefited by different manures and fertilizers and their average rates of application.*

Type of Arca	Crop	Kind of organic manure or chemical fertilizer	Percentage area benefited by different manures and fertilizers in holdings of different sizes				Average rate of application in quintals per hectare	
			Very small	Small	Medium	Large		
IADP	Paddy	F.Y.M. or compost	81	94	89	94	90	99
		Nitrogenous fertilizer	64	72	66	58	65	1.57
		Phosphatic fertilizer	55	64	59	45	56	1.49
		Potassic fertilizer	—	—	6	88	5	0.73
Ragi		F.Y.M. or compost	100	93	95	97	96	70
		Nitrogenous fertilizer	—	9	7	8	8	0.73
		Phosphatic fertilizer	—	—	8	8	8	0.83
Sugarcane		F.Y.M. or compost	79	94	95	92	162	
		Nitrogenous fertilizer	79	88	98	100	93	5.87
		Phosphatic fertilizer	58	91	92	95	88	4.30
		Potassic fertilizer	—	—	—	3	3	2.16
Control	Paddy	F.Y.M. or compost	100	89	90	88	92	115
		Nitrogenous fertilizer	35	56	30	29	38	1.37
		Phosphatic fertilizer	—	39	25	—	28	1.33
Ragi		F.Y.M. or compost	100	83	92	100	94	85
		Nitrogenous fertilizer	—	—	—	—	—	—
		Phosphatic fertilizer	—	—	—	—	2	0.84
Sugarcane		F.Y.M. or compost	73	100	77	75	79	260
		Nitrogenous fertilizer	64	86	92	83	81	4.52
		Phosphatic fertilizer	55	—	—	—	26	3.45

The average rates of application of the chemical fertilizers have not been presented separately for each holding size since the observations for many of the holding sizes were few.

ANNEXURE 18.6  
*Average yield in quintals per hectare in Mandyā district and its comparable areas*

Crop	Year	Mandyā district			Control area			Average yield			
		Area in '00' hectares	Number of experiments	Average yield	Standard error	Area in '00' hectares	Number of experiments	Average yield	Standard error	Mysore State excluding Mandyā district	Adjoining districts*
1	2	3	4	5	6	7	8	9	10	11	12
Rice	Av. for 3 years 1959-62	588	14.9							13.3	16.1
	1962-63	580	319	22.1	0.51	267	74	27.5	0.92	13.8	16.0
	1963-64	597	292	21.3	0.56	279	72	26.1	0.95	13.4	16.0
	1964-65	596	311	24.1	0.48	273	73	28.7	1.18	14.9	19.1
	Av. for 3 years 1962-65	591	22.5	0.30				27.4	0.59	14.0	17.3
Ragi	Av. for 3 years 1959-62	732	7.7							7.9	8.2
	1962-63	727	292	7.2	0.34	252	64	7.8	0.64	8.2	8.2
	1963-64	692	301	7.5	0.26	226	74	8.2	0.59	8.2	8.5
	1964-65	713	318	8.7	0.35	257	74	7.5	0.55	7.8	8.2
	Av. for 3 years 1962-65	711	7.8	0.18				7.8	0.34	8.2	8.3

ANNEXURE 18.6 (*Continued*)

	1	2	3	4	5	6	7	8	9	10	11	12
Av. for 3 years	114				95.0						68.8	64.6
Sugarcane	1959-62	106	148	110.1	4.05	13	43	89.9	4.36	77.1	57.0	
	1962-63	110	209	112.0	3.82	16	57	81.2	4.92	81.5	77.8	
	1963-64	111	284	114.0	1.88	16	63	107.3	5.77	76.7	76.3	
	1964-65	109		112.0	1.57			93.6	2.96	78.4	70.4	
Av. for 3 years	1962-65											

\*Adjoining districts—Bangalore, Hassan, Mysore and Tumkur.

## ANNEXURE 18.7

*Estimated production of principal crops grown in Mandya district*

Year	Estimated Production (in 00' Tonnes)			Value of total production* (Rs. in lakhs)
	Rice	Ragi	Sugarcane (Gur)	
1	2	3	4	5
Average for 3 years 1959-62	876	564	1083	1251
1962-63	1282	519	1167	1559
1963-64	1272	518	1232	1575
1964-65	1436	610	1265	1745
Average for 3 years 1962-65	1330	552	1221	1626
Percentage increase or decrease of the average production of years 1962-65 over average for the years 1959-62	51.8	-2.1	12.7	30.0
Percentage increase or decrease of the average State production of years 1962-65 over average for the years 1959-62	12.6	7.1	36.4	14.3

\* Value of production was worked out on the basis of State harvest prices for 1960-61.



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## ANNEXURE 18.8

*Yield rates of different crops separately for participant and non-participant cultivators in Mandy District*

Crop	Year	Percentage of participant cultivators	Average yield in quintals per hectare	
			Participant	Non- participant
1	2	3	4	5
Rice	1962-63	9	25.8	22.0
	1963-64	11	27.1	21.8
	1964-65	51	26.3	21.0
Ragi	1962-63	7	8.0	6.9
	1963-64	17	9.8	6.8
	1964-65	30	11.3	7.4
Sugarcane (Gur)	1963-64	51	117.0	104.1
	1964-65	53	123.4	110.1

Note: The information on the average yield of the participant cultivators in 1962-63 in respect of sugarcane crop was not collected.

## ANNEXURE 18.9

*Percentage distribution of fields sampled in Mandya district for different combinations of practices—Irrigation (I), Manure (M) and Fertilizers (F) and their average yields in quintals per hectare.*

Practices followed	RICE											
	1962-63			1963-64			1964-65			Pooled over all years		
	No. of fields in the class	Per centage to the total	Average yield	No. of fields in the class	Per centage to the total	Average yield	No. of fields in the class	Per centage to the total	Average yield	No. of fields in the class	Per centage to the total	Average yield
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
I M F	175	67	24.0	168	68	23.7	224	79	26.2	567	71	24.8
I M O	59	22	21.2	47	19	20.3	31	11	17.7	137	17	20.1
I O F	11	4	22.6	5	2	21.3	7	3	17.2	23	3	20.7
I O O	4	2	**	2	1	**	—	—	—	6	1	18.0
Total	249	95	23.2	222	90	22.9	262	93	24.9	733	92	23.7
O M F	—	—	—	1	*	**	6	2	17.0	7	1	15.4
O M O	14	5	9.4	25	10	11.5	14	5	7.0	53	7	9.8
O O F	—	—	—	—	—	—	—	—	—	—	—	—
O O O	—	—	—	—	—	—	—	—	—	—	—	—
Total	14	5	9.4	26	10	11.3	20	7	10.0	60	8	10.5

\* Percentage is less than 0.5.

\*\* Average yield has not been given since the observations are few.

## ANNEXURE 18.9—(Contd.)

*Percentage distribution of fields sampled in Manjha district for different combinations of practices—Irrigation (I), Manure (M) and Fertilizers (F) and their average yields in quintals per hectare.*

Practices followed	R A G I						Pooled over all years					
	1962-63			1963-64			1964-65					
	No. of fields in the class	Per centage to the total	Average yield	No. of fields in the class	Per centage to the total	Average yield	No. of fields in the class	Per centage to the total	Average yield	No. of fields in the class	Per centage to the total	Average yield
I	2	3	4	5	6	7	8	9	10	11	12	13
I M F	3	1	†	14	6	13.4	10	4	14.8	27	3	13.5
I M O	1	*	†	2	1	†	1	*	†	4	1	†
I O F	1	*	†	1	*	†	—	—	—	2	*	†
I O O	—	—	—	—	—	—	—	—	—	—	—	—
Total	5	2	11.1	17	7	12.6	11	4	13.7	33	4	12.7
O M F	17	7	7.2	26	10	8.8	86	30	11.0	129	16	10.0
O M O	210	86	6.7	207	81	6.7	177	62	6.9	594	76	6.8
O O F	1	*	†	1	*	†	5	2	15.5	7	1	15.2
O O O	11	5	5.8	4	2	†	7	2	7.9	22	3	6.8
Total	239	98	6.8	238	93	6.9	275	96	8.4	752	96	7.4

\* Percentage is less than 0.5.

† Average yield has not been given since the observations are few.

## ANNEXURE 18.9—(Contd.)

*Percentage distribution of fields sampled in Mandya district for different combinations of practices—Irrigation (I), Manure (M) and Fertilizers (F) and their average yields in quintals per hectare.*

Practices followed	SUGARCANE (Gur)											
	1962-63			1963-64			1964-65			Pooled over all years		
	No. of fields in the class	Per centage yield to the total	No. of fields in the class	Per centage yield to the total	No. of fields in the class	Per centage yield to the total	No. of fields in the class	Per centage yield to the total	No. of fields in the class	Per centage yield to the total	No. of fields in the class	Per centage yield to the total
I M F	126	94	113.5	162	94	108.9	250	95	118.7	538	95	114.5
I M O	3	2	†	3	2	†	4	2	†	10	2	80.3
I O F	3	2	†	—	—	—	6	2	115.7	9	2	90.5
I O O	1	1	†	—	—	—	2	1	†	3	*	†
Total	133	99	111.0	165	96	107.8	262	100	117.4	560	99	113.9
O M F	—	—	—	6	4	130.3	1	*	†	7	1	117.6
O M O	1	1	†	—	—	—	—	—	—	1	*	†
O O F	—	—	—	—	—	—	—	—	—	—	—	—
O O O	—	—	—	—	—	—	—	—	—	—	—	—
Total	1	1	†	6	4	130.3	1	*	†	8	1	109.7

\* Percentage is less than 0.5.

† Average yield has not been given since the observations are few.

*Percentage distribution of fields sampled in Mandya district according to source of seed used and average yield in quintals per hectare for each source*

Crop	Source of seed	1962-63				1963-64				1964-65			
		No. of fields	Percentage to the total	Average yield in	No. of fields	Percentage to the total	Average yield in	No. of fields	Percentage to the total	Average yield in	No. of fields	Percentage to the total	Average yield in
Rice	Own Source	126	53	22.1	160	66	20.7	169	60	22.6			
	Co-operative society/ Government	23	10	21.3	25	10	28.7	45	16	29.1			
	Regd. seed growers	7	3	22.5	11	5	20.7	13	5	31.0			
	Others	81	34	22.8	46	19	22.5	52	19	20.5			
Ragi	Own Source	116	58	7.1	196	80	7.0	236	83	8.4			
	Co-operative society/ Government/Regd. seed growers	5	3	9.7	5	2	5.2	6	2	12.7			
	Others	78	39	6.9	43	18	8.6	44	15	8.8			
Sugarcane (Gur)	Own source	48	39	115.3	77	41	101.3	92	39	104.5			
	Co-operative society/ Government	15	12	104.4	24	13	96.3	18	7	132.0			
	Regd. Seed growers	1	1	+	3	2	+	11	5	131.2			
	Others	58	48	111.2	82	44	125.3	115	49	123.2			

+ Indicates that average yield has not been calculated since the observations are too small.

## CHAPTER XIX

### SURAT (GUJARAT)

#### I

19.1 The district of Surat has a total geographical area of about 11.6 thousand square kilometres and comprises of 21 revenue units of *talukas* or 'mahals'. It is delimited into 34 blocks and has 2198 villages. It has a population of 24.52 lakhs (1961 census) out of which 78 per cent is rural. The density of population per square kilometre is 211. The district is served by 3376 kilometres of roads out of which 1341 kilometres are metalled. The railway lines cover 236 kilometres. Surat district is now bifurcated into two districts viz. Surat and Bulsar since 1st May 1963.

19.2 The average rainfall of the district is 98 cm. which is mostly confined to monsoon months from the second week of June till the end of September. Four types of soils are found, namely, 'khar' lands, black cotton soil, light soils and '*gorat*' soils. The first three types lie parallel to the sea-coast line on the west, *khar* lands being followed by black cotton soils and light soils. The '*gorat*' soils are found on the banks of rivers flowing through the district. The eastern part of the district inhabited by *adivasi* cultivators, comprises mostly of hills and forests.

#### *Land Utilisation*

19.3 The average net area sown for the three years 1958-59 to 1960-61 was 7.4 lakh hectares or about 64 per cent of the geographical area. About 8 per cent of the net sown area was double-cropped, making the gross cropped area 8.0 lakh hectares out of which 2.8 per cent was irrigated. Wells form the most important source of irrigation accounting for about 58 per cent of the irrigated area followed by canals irrigating 33 per cent and tanks 9 per cent. The Kakrapar Project also provides irrigation facilities to the district. Annexure 19.1 gives land utilisation data for the district for three years ending 1961-62.

#### *Cropping Pattern*

19.4 Foodgrains occupy about 36 per cent of the gross cropped area. Rice is the predominant food crop and covers 15 per cent of gross cropped area. Among the commercial crops, cotton is the most important covering 20 per cent of the gross cropped area followed by groundnut and sugarcane. During the three years preceding the introduction of the IADP, cereals output in the district averaged 2.20 lakh tonnes per annum, which included 1.44 lakh tonnes of rice. The oilseed production averaged

0.18 lakh tonnes, cotton 0.17 lakh tonnes and sugarcane 0.19 lakh tonnes. Annexure 19.2 shows the area, production, and yield per hectare of food-grains and major commercial crops before the commencement of the programme.

#### *Land Tenure*

19.5 In Surat district, the most prevalent form of tenure is '*ryotwari*' which accounts for 94.6 per cent of occupied land and only 5.4 per cent of the lands are under non-*ryotwari* tenures like '*uran*' and '*udhad*' *jamabandi*. The holders of land are divided into three classes, viz, (i) owner cultivators, (ii) land cultivated under supervision and guidance of owners and, (iii) land rented to tenants. The tenants constitute 14.4 per cent of the holders of land. The majority of holdings in the district are in the group less than 2 hectares covering 64.4 per cent of the total number of land holders but accounting for only 19.2 per cent of the total area under land holdings. The next class of holders owning between 2 to 6 hectares form 23.3 per cent of the total number of holders and account for 25.0 per cent of the total area held.

19.6 The Bombay Tenancy Act of 1939 was applied to this district in the year 1946 with a view to ameliorating the conditions of tenants without injuring the legitimate interests of the landlords. The Act was replaced by the Bombay Tenancy and Agricultural lands Act, 1948, under which the maximum rent of land was fixed at one third and one fourth of the total produce in case of non-irrigated lands and irrigated lands respectively. A valuable right in favour of the protected tenants has been conferred by the Act in the form of the privilege of purchasing his holding from the land-lord.

19.7 Since 1948 many amendments have been made to the Act. The one made by the Bombay Tenancy and Agricultural Lands (Amendment) Act 1955 was intended to vest occupancy rights in lands on the tiller of the soil and imposition of ceilings on individual holdings. The Act defines an economic holding as (i) 6.5 hectares of '*jirayat*' land or (ii) 3.2 hectares of seasonally irrigated land or paddy land or (iii) 1.6 hectares of perennially irrigated land. The ceiling limit is stipulated at three times the economic holdings. Since very few holdings fall within the larger holdings, a sizeable surplus land for redistribution cannot be expected as a result of ceiling on holdings.

#### *Administrative Arrangements*

19.8 The *Zila Parishad* has been made responsible for implementing the IAD Programme in the district. The technical supervision is being provided by the State Director of Agriculture. Within the district, the Project Officer, who belongs to State Class I Agriculture Service, is directly

responsible for all aspects of the IADP. He is assisted by a team of five subject-matter specialists in the different fields related to agriculture viz., Agronomy, Plant Protection, Horticulture, Agricultural Information and Soil-cum-irrigation. The specialist staff is responsible for providing technical guidance to the staff at the block level. They also assist in the training of field staff in their respective subjects for the successful execution of the programme. The Project Officer is also assisted by the Assistant District Registrar, Cooperative Societies, who looks after credit, supplies, marketing and storage aspects of the programme.

19.9 At the block level, 10 Village Level Workers, 4 Extension Officers (Agriculture), 1 Extension Officer (Cooperative) and 2 Cooperative Supervisors have been provided over and above the normal Community development staff in order to facilitate effective implementation of the programme. Most of the staff sanctioned was in position by the end of June, 1965. Annexure 19.3 shows the position in respect of the appointment of additional staff.

19.10 The State Government had not, till recently, set up any coordination committee at the State level. This has been done now. At the district level, the coordination committee is functioning under the chairmanship of the President of *Zila Parishad* and reviews the progress of the programme periodically.

#### *Coverage*

19.11 The programme was launched in the district during the kharif season of 1962-63 in all the 2198 villages spread over all the 29½ blocks. During the year 1963-64, the blocks and villages covered remained unchanged while during 1964-65 certain tribal area blocks were included under the programme bringing the total number of blocks covered to 34. The cultivated area covered increased from 1.50 lakh hectares in 1962-63 to 1.77 lakh hectares in 1963-64 and 2.29 lakh hectares during 1964-65 representing about 20 per cent, 23 per cent and 30 per cent respectively of the gross cropped area in the blocks.

19.12 The number of farm plans prepared has gone up from 70,770 in 1962-63 to 87,429 in 1963-64 and 95,439 in 1964-65 comprising respectively 29 per cent, 36 per cent and 40 per cent of the total number of cultivating families in the district.

#### *Fertilizers*

19.13 The table below shows the distribution of nitrogenous and phosphatic fertilizers :

*Fertilizer Distribution in Tonnes*

Year	Nitrogenous (in terms of Ammon. sulphate)	Phosphatic (in terms of Superphosphate)
1961-62 (Pre-package)	10,032	2,934
1962-63	13,452	3,062
1963-64	16,093	4,180
1964-65	24,116	6,113

19.14 It will be seen that the offtake of nitrogenous fertilizers has gone up by 140 per cent and that of phosphatic fertilizers by 108 per cent between 1961-62 and 1964-65. The fertilisers are distributed through cooperative sale depots. The number of such depots was 161 in 1961-62, 211 in 1963-64 and 238 in 1964-65.

*Improved Seeds*

19.15 The quantity of improved seeds distributed stood at 941 tonnes during the year 1961-62. It went up to 1090 tonnes during 1963-64 and to 1784 tonnes in 1964-65. The area covered by improved seeds has gone up from 0.46 lakh hectares during 1961-62 to 0.53 lakh hectares in 1963-64 and to 0.60 lakh hectares in 1964-65. The entire area under cotton, sugarcane and banana is under improved varieties.

*Plant Protection*

19.16 Measures have been taken for the prophylactic treatment of the seeds and crops on an area-wide basis to ward-off attacks of pests and diseases. Each block is provided with adequate number of hand sprayers. In 8 blocks, power sprayers have also been provided. The progress of plant protection measures is shown in the following table :—

Year	Area treated against pests and diseases (hectares)	Seed treated (tonnes)	Pesticide formulations used (tonnes)
1961-62 (Pre-package)	9,324	8	19
1962-63	36,366	32	33
1963-64	75,361	56	72
1964-65	89,768	224	37

### *Improved Implements*

19.17 The agricultural implements workshop is yet to be established. The acquisition of land for the workshop is under progress. The requisite staff consisting of one Agricultural Engineer and one Assistant Agricultural Engineer has been brought in position. Improved implements such as Hyderabad plough, Baroda hoe, Karjat hoe, Plant puller and Sayar harrow are generally kept at block headquarters and at the headquarters of the village level workers and their working is demonstrated to the cultivators.

### *Demonstrations*

19.18 Composite demonstrations involving the use of "package of practices" are being laid on cultivators' fields. The number of such demonstrations laid was 1,000 in the year 1962-63. It increased to 1,200 during the year 1963-64. Since 1964-65 greater emphasis is being laid on the quality and follow-up of demonstrations and as such their number was reduced to 850. The average yield in demonstration plots as compared to 'control' during 1964-65 showed an increase of 31 per cent in case of paddy, 34 per cent in the case of wheat, 40 per cent in the case of jowar (*Barani*), 35 per cent in groundnut and 60 per cent in irrigated cotton. An economic analysis of these demonstrations shows a return of Rs. 1.60 to Rs. 3.36 for each additional rupee spent on the recommended practices.

### *Soil Testing*

19.19 The building for the soil testing laboratory has been constructed at Bardoli in Surat district. The necessary staff has also been sanctioned and appointed. However, the laboratory is still to be equipped. The work has so far been carried out at the soil testing laboratory, Junagarh. The progress made in testing of soil samples is indicated below :

Year	Samples collected	Samples tested	Fertilizer recommendations made
1963-64	1586	1556	1208
1964-65	3921	3674	3674

### *Minor Irrigation*

19.20 There are about 11,000 wells used for irrigation purposes in Surat district. Out of these, 3600 wells are fitted with oil engines and electric motor pumps. In all about 12,140 hectares are irrigated by well waters. The number of irrigation tanks in the district is 2100 and they

are being used for giving protective irrigation to paddy crop. The aggregate area irrigated by tanks comes to about 4047 hectares. This area, however, varies from year to year, depending upon the regularity of rains. These tanks used to go dry from December onwards before the construction of Kakrapar Irrigation Project. At present, most of these tanks are refilled with water from Kakrapar Canals before they go dry in December and the water from the tanks is then utilised for growing wheat in about 2023 hectares in rabi season, after paddy is harvested. Some of these tanks are now used for rearing of fish as a part of the IAD Programme.

#### *Cooperative Credit and Marketing*

19.21 The coverage of primary credit societies increased from 92 per cent of villages in the year 1961-62 to 96 per cent during 1963-64 and to 100 per cent in the year 1964-65. The percentage of agricultural population covered by the societies increased meanwhile from 28 to 45. The number of these societies has gone up from 641 in 1961-62, the year immediately preceding the introduction of the Package Programme, to 673 in 1963-64 and to 702 in 1964-65. During the same period, the membership has risen from 1.08 lakhs to 1.18 lakhs and to 1.25 lakhs respectively. The share capital of these societies which stood at Rs. 44.00 lakhs in 1961-62 rose to Rs. 50.23 lakhs in 1963-64 and to Rs. 60.07 lakhs in 1964-65. The amount of loans advanced by these societies has registered a rise from Rs. 98.80 lakhs in 1961-62 to Rs. 148.21 lakhs in 1963-64 and to Rs. 164.70 lakhs during 1964-65. The percentage of the loans issued in kind to the total amount of loans advanced has witnessed a rise from 3 in 1960-61 to 19 in 1962-63 and 25.33 in 1963-64. The percentage of over-dues declined from 42.06 in 1961-62 to 26.6 in 1962-63 and to 18.2 during the year 1963-64 but this increased to 22 per cent during 1964-65.

19.22 In addition to cooperative loans, the Government issued *taccavi* loans to agriculturists to the tune of Rs. 6.79 lakhs during 1962-63 and Rs. 6.06 lakhs in the year 1963-64.

19.23 The membership of the Cooperative Central Bank, Surat stood at 5464 in 1961-62, 4725 in 1963-64 and 4663 in the year 1964-65. The share capital of the bank increased from Rs. 24.89 lakhs in 1961-62 to Rs. 29.96 lakhs in 1963-64 and to Rs. 32.62 lakhs in 1964-65. The amount of loans advanced by the Central Bank has increased from Rs. 108.13 in 1962-63 to Rs. 124.89 lakhs in 1963-64 and to Rs. 160.82 lakhs in 1964-65.

19.24 About 50 per cent of the primary credit societies have adequate borrowing power to fulfil the requirements of their members. The societies in *adivasi* areas are, however, not in a position to meet the loan-requirements of their members. The annual borrowing capacity of societies having small share capital is being increased from 8 times the

share capital to 12 times. A phased programme has been drawn up to strengthen the primary societies, revitalising the weak societies and increasing their membership and share capital, in addition to providing qualified managerial staff. Efforts are also being made to increase the share capital of the societies.

19.25 The number of primary marketing societies has increased from 75 in 1961-62 to 79 in 1963-64 and 1964-65; their membership has risen from 0.39 lakh in 1961-62 to 0.43 lakh in 1964-65. The share capital of these societies, however, decreased over this period from Rs. 26.54 lakhs in the year 1961-62 to Rs. 24.79 lakhs in 1964-65. The value of agricultural produce marketed by these societies has increased from Rs. 198.00 lakhs in 1961-62 to Rs. 499.61 lakhs in 1963-64 and to Rs. 528.93 lakhs in 1964-65.

19.26 In this district the marketing societies also advanced crop loans to their individual members. During the year 1961-62, in repayment of crop loans the primary agricultural credit societies collected agricultural produce worth Rs. 35.61 lakhs, while during 1962-63 these societies collected produce valued at Rs. 108.82 lakhs from their members. Recovery of such loans effected during 1964-65 amounted to Rs. 171.84 lakhs.

#### *Storage Godowns*

19.27 As against 200 godowns needed to saturate the district, 113 were existing as in June, 1964 and 55 were under construction. During the year ending June, 1965, 19 godowns were added to the number existing last year, bringing the total number of godowns constructed to 132.

#### *Results of Agronomic and Agro-economic Survey*

19.28 Agronomic and agro-economic enquiry in the district was initiated in the year 1962-63 and since then it is being repeated annually. In each year about 900 cultivators' holdings in the IADP district and 200 cultivators' holdings in the control blocks were randomly selected. Control blocks were Ankleshwar, Hansot, Jhagadia, Valia and Chaswad in Broach district. The cropping pattern in the control area is similar to the one followed in the northern parts of Surat district. Control area for south Surat could not be selected since area with similar agro-climatic conditions was not available within the State. In this section, the results relating to the enquiry conducted during 1962-63 are discussed.

#### *Holding Size*

19.29 The sampled cultivators were classified into four groups according to the size of their holdings. The proportion of the cultivators

falling in the four groups, the area cultivated by them and the average size of holdings are given in the table below:

	Holding size		
	Small (upto 2 hectares)	Medium (2—4 hectares)	Large (4-8 hectares) (over 8 hectares)
Percentage of the cultivators in the group to the total	48	26	17
Average size in hectares	0.9	2.9	5.6
Percentage of cultivated area for the group to the total	15	26	29
			30

19.30 About one-fourth of the cultivators had holdings exceeding 4 hectares which accounted for about three-fifths of the cultivated area. The holdings of about 50 per cent of the sampled cultivators were less than 2 hectares in size and covered only about one-seventh of the cultivated area. The remaining one-fourth had holdings between two to four hectares. The average size of holding in the largest size class was of the order of 12 hectares.

#### *Cropping pattern*

19.31 The cropping pattern followed by the cultivators in the different holding size groups is presented in Annexure 19.4. It would be observed that paddy, jowar and cotton which are the principal crops of the district, accounted for about 60 per cent of the gross cropped area. The cropping pattern adopted in different size groups showed a considerable variation. The percentage area under foodgrain crops decreased steadily with the increase in the holding size, being 72 per cent for the small holding size group and 50 per cent for the large holding size group cultivating land more than 8 hectares. This was largely due to the reduction in the proportion of area under paddy crop. The area under cash crops increased with the holding size. It was mainly due to the higher proportion of the area under cotton in large size groups.

#### *Facilities for supplies, storage and marketing*

19.32 Improved seeds of cotton and chemical fertilizers like nitrogenous fertilizers were the chief production supplies received by the cultivator. The percentage of the cultivators as well as the average quantity taken by a farmer of these production requisities like seed and

fertilizer increased with the holding size. Percentage of the cultivators who availed of the supply of improved seed increased from 11 in the small size group to 38 in the large size group and the corresponding increase for the nitrogenous fertilizer was 9 per cent to 18 per cent. Average quantity of improved cotton seed received by the cultivator increased from 14 kg. in the small size holding to 52 kg. in the large size group while the corresponding increase for the nitrogenous fertilizer was 63 kg. to 357 kg. The quantity taken by a cultivator per hectare decreased with the holding size for improved seed as well as for nitrogenous fertilizer. In respect of improved seed, it decreased from about 14 kg. to 7 kg. per hectare while for nitrogenous fertilizer the corresponding decrease was from 63 kg. to 46 kg.

19.33 The survey indicated that the facility for storage of farm produce and production supply was available for about 60 per cent of the villages within a reasonable distance. The facilities for the supply of production requisites like improved seeds and fertilizers were available to about 80 per cent of the sampled villages either inside the village or in its neighbourhood. In respect of other production supplies, such facilities were available for about 50 per cent of the villages only. Cooperative societies were the chief agencies for their supply. In general, chemical fertilizers were distributed through cooperative societies but fertilizer mixtures were distributed through private agencies also.

19.34 It was observed that the marketing facilities of cash crops in the district were better than those for the foodgrains; this is mainly due to the net-work of well organised cooperative societies for the individual commercial crops. About 80 per cent of villages enjoyed marketing facilities for the cash crops. Facilities for sale of cattle food and milk products were available for about 20 per cent of the villages. Cooperative as well as private agencies played equally vital role in assisting the cultivator in marketing agricultural surplus.

#### *Use of fertilizers and manures*

19.35 About 18 per cent of the cultivators in the kharif season and 7 per cent in the rabi season used chemical fertilizer and this was mostly applied in conjunction with F.Y.M. or compost. The proportion of cultivators using chemical fertilizers in the kharif season increased from 13 per cent in the small holdings to 31 per cent in the large size holdings above 8 hectares. During the rabi season no such variation associated with holding size was observed.

19.36 Chemical fertilizers were generally applied to paddy, groundnut, cotton, jowar and sugarcane in the district. The total quantity of nitrogenous fertilizer distributed was of the order of 13,500 tonnes in the district. About 50 per cent of the distributed quantity was consumed by paddy and 18 per cent by each of the crops cotton and sugarcane; the remain-

ing was consumed by a variety of other crops. About 3,100 tonnes of phosphatic fertilizer was distributed in the district. It is estimated that about 70 per cent of this quantity was applied to paddy while 10 per cent, 8 per cent and 6 per cent were used on cotton, sugarcane and chillies respectively.

*Percentage area benefited and rates of application*

19.37 Percentage area benefited and rate of application in different holding size groups for paddy, jowar and cotton crops are presented in Annexure 19.5. Percentage area benefited by manures and fertilizers was highest for paddy as compared to cotton and jowar. Percentage area benefited by F.Y.M. or compost in respect of jowar as well as cotton was of the order of 40 per cent as against 67 per cent for paddy crop. Use of green manure was observed on about 11 per cent of the area under paddy and 7 per cent under cotton. Among the chemical fertilizers, the nitrogenous fertilizers were most popular. About 17 per cent of the paddy area was benefited by the nitrogenous fertilizers; the corresponding areas benefited in respect of jowar and cotton were small, being of the order of 4 per cent and 7 per cent respectively. Rate of application of nitrogenous fertilizer to paddy was 117 kg. per hectare as against the recommended rate of 224 kg. per hectare. The rates of application of nitrogenous fertilizers in respect of jowar and cotton were 92 kg. and 98 kg. as against the recommended dose of 112 kg. per hectare for each of the crops.

19.38 A study of the percentage area under different crops benefited by manurial application and their average rates of application was made in relation to the holding size. In respect of paddy, percentage area in different holding sizes benefited by F.Y.M. was more or less of the same order, but the average rate of application decreased with the increase in the holding size. In respect of jowar and cotton, percentage area benefited by F.Y.M. as well as its average rate of application decreased with the increase in the holding size. Rate of application of nitrogenous fertilizer to paddy decreased with the increase in holding size, the rates being 155 kg. per hectare and 90 kg. per hectare respectively in small and large size holdings cultivating land more than 8 hectares. In case of cotton, the results were opposite; it increased from 38 kg. per hectare in small holdings to 148 kg. per hectare in large holdings.

19.39 Percentage area benefited by phosphatic fertilizer was negligible; it was about 5 per cent for paddy and 2 per cent for each of the crops jowar and cotton.

19.40 Use of chemical fertilizer which is the most important input item for increasing crop production was confined to a small percentage of area. If the saturation of the entire area under paddy, jowar and cotton with the application of nitrogenous fertilizer at the recommended rate is

taken as the target (saturation level), then the percentages of consumption to saturation level reached during 1962-63 in respect of all the three crops were of the order of 9, 3 and 6 respectively. It will be obvious that still a big gap exists between the saturation limit and the present level of consumption.

### III

#### *Results of crop-cutting surveys—1962-65*

19.41 Crop-cutting surveys are being conducted every year since 1962-63 on paddy, jowar and cotton, the principal crops grown in the district. In control blocks also the crop-cutting surveys on jowar and cotton are conducted annually. Such surveys could not be conducted on paddy crop as suitable control blocks growing paddy could not be selected. The results of the survey conducted during the years 1962-65 are presented in Annexures 19.6 to 19.10.

19.42 It may be seen from Annexure 19.6 that the increase in the average yield of rice during the programme years, namely, 1962-65 over 1959-62 is of the order of 10 per cent. Increasing trend of yield for rice was observed during the period in the district while such trend was absent for the remaining two crops. For a proper assessment of the changes in the yield rates of the principal crops grown in the district, brought about through efforts done under the programme, it is necessary to study the comparative yield rates in successive years for the IADP district as well as the control areas having similar agronomic conditions. Such rigorous analysis could not be carried out for the district and for other new districts since the data were available only for three years.

#### *Participants vs. non-participants*

19.43 Fields sampled under crop-cutting surveys were classified into two groups according to whether the cultivator is participant or non-participant in the intensive programme. Average yield for the two groups were obtained separately and are presented in Annexure 19.8 for all the three principal crops. The percentage of the participant cultivators was increasing every year. In respect of rice crop about one-third of the total cultivators growing rice participated in the programme during the last two years as against 15 per cent in the first year. For jowar crop, the percentage of participants increased from 17 per cent in 1962-63 to 32 per cent in 1964-65. The yield rate of participant cultivators for rice and jowar crops was higher as compared to non-participant cultivators. The magnitude of the average difference was of the order of 2 quintals per hectare or more for both the crops. In respect of cotton crop, no difference in yield rates was observed in the two groups.

*Agronomic practices*

19.44 In the district, paddy, jowar and cotton are grown generally under rainfed conditions. It may be seen from Annexure 19.9 that in case of rice, the fields treated with chemical fertilizers gave consistently higher yield rates as compared to the untreated fields over all the years. The additional yield rate obtained varied from 3 to 6 quintals per hectare in different years.

19.45 Percentage area under paddy and jowar sown with improved seeds was of the order of 30 per cent and 40 per cent respectively in all the three years. The improved strain No. Z-31 for paddy crop gave higher yield as compared to other improved varieties. The additional yield over the local variety was more than three quintals of rice per hectare for all the three years. In respect of jowar crop, the improved strain No. B.P-53 showed superiority over the local varieties in all the three years covered by the survey. The additional yield obtained in fields sown with improved seeds was of the order of one quintal per hectare. Almost the entire area under cotton was sown with strain No. 2087.

19.46 In Annexure 19.10, distribution of fields according to source of seed and the average yield rate for each source is presented. It may be observed that the average yield in fields under paddy and jowar sown with seeds obtained from cooperative societies or Government was higher than that obtained in fields sown with home-grown or locally-purchased seeds. In respect of paddy crop, the additional yield was of the order of two quintals of rice per hectare while it was more than three quintals per hectare for jowar crop.

गोपनीय राज्यपाल

## ANNEXURE 19.1

*Land Utilisation and Irrigation—Surat (Gujarat)*

(00 Hectares)

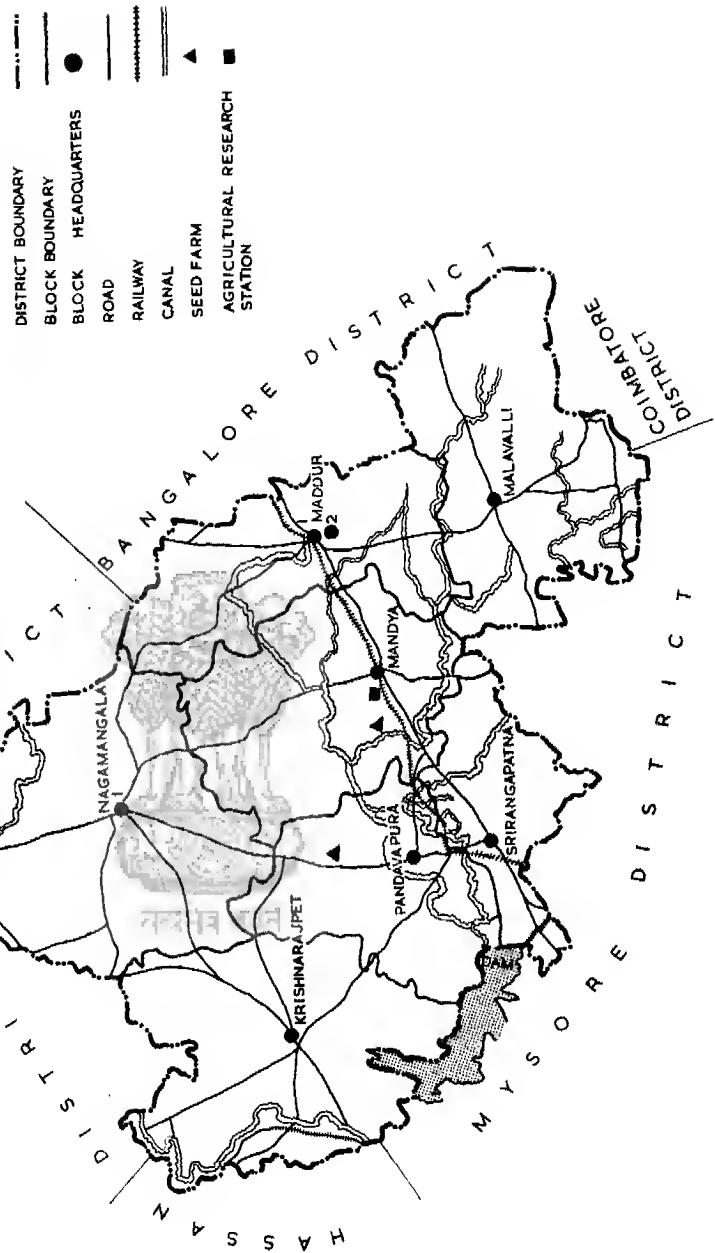
S. No.	Type of area according to use	1959-60	1960-61	1961-62	Average
1	2	3	4	5	6
1.	Geographical area	11581	11564	11562	11569
2.	Forest	1567	1369	1368	1435
3.	Barren & uncultivable land	1119	1064	1064	1082
4.	Land put to non-agricultural use including home-steads, grave yard, road, canals, lakes etc.	142	226	235	201
5.	Cultivable waste	588	587	594	590
6.	Permanent pasture and other grass lands	569	580	578	576
7.	Land under miscellaneous tree crops and groves not included in the net area sown	7	40	40	29
8.	Current fallows	41	99	93	78
9.	Fallow land other than current fallows	226	151	147	175
10.	Net area sown	7322	7448	7443	7404
11.	Net area sown expressed as percentage of geographical area	63	64	64	64
12.	Area sown more than once	566	552	627	582
13.	Area sown more than once expressed as percentage of net area sown	8	7	8	8
14.	Gross cropped area	7888	8000	8070	7986
15.	Net irrigated area	178	197	302	226
16.	Area irrigated more than once	2	—	—	—
17.	Gross irrigated area	180	197	302	226
18.	Net irrigated area expressed as per cent of net area sown	2	3	4	3
19.	Gross irrigated area expressed as per cent of gross cropped area	2	3	4	3

# DISTRICT MANDYA

## mysore

SCALE IN MILES.  
4 2 0 4 8 12

### INDEX



**ANNEXURE 19.2**

**Estimates of Area, Production and Yield of Major Crops—Seraf (Gujarat).**

Crop	Area (Hectares)					Production (Metric Tons)					Yield (Quintals per Hectare)				
	1959-60		1960-61		Average 1959-62	1959-60		1960-61		Average 1959-62	1959-60		1960-61		Average 1959-62
	1	2	3	4	5	6	7	8	9	10	11	12	13		
1. Rice	113501	119175	133673	122116	132570	115822	184372	144255	11.68	9.72	13.79	11.8			
2. Jowar	87432	105698	107863	100331	23383	48134	52704	41407	2.67	4.55	4.89	4.1			
3. Bajra	1619	2887	4852	3119	3399	1054	3108	1520	2.46	3.65	6.41	4.9			
4. Maize	215	59	296	190	190	90	66	398	1.85	4.19	11.19	13.45	9.7		
5. Ragi	20439	17636	23655	20577	16085	14370	21210	17205	7.85	8.15	8.97	8.4			
6. Small Millets	15528	11069	14416	13671	11573	9204	15522	12100	7.45	8.32	10.77	8.9			
7. Wheat	7924	11893	11715	10511	3041	2628	4699	3456	3.84	2.21	4.01	3.3			
8. Total Cereals	246653	268417	270515	187091	191278	282013	220128	7.59	7.13	9.51	8.1				
9. Gram	4344	3874	4425	4214	1974	1306	1942	1741	4.54	3.37	4.39	4.1			
10. Tur	14245	16942	17453	16213	6333	8608	9977	8306	4.45	5.08	5.72	5.1			
11. Ground-nut	12503	20323	24507	19111	8796	17091	25459	17115	7.04	8.41	10.39	9.0			
12. Castor	2226	2176	3957	2786	831	762	1293	962	3.73	3.50	3.27	3.5			
13. Sesamum	471	334	333	379	88	74	118	93	1.87	2.22	3.54	2.5			
14. Rape & Mustard	57	3	110	57	20	1	54	25	3.51	3.33	4.91	4.4			
15. Total Oil seeds	15257	22836	28907	22333	9735	17928	26924	18195	6.38	7.85	9.31	8.1			
16. Sugarcane (Gur)	1983	3271	3399	2884	10373	23526	22149	18683	52.31	71.92	65.16	64.8			
17. Cotton	156742	154917	156121	155927	11929	25281	13089	16766	0.76	1.63	0.84	1.1			

## ANNEXURE 19.3

*Additional Staff sanctioned and in position for IADP, Surat*

S. No.	Category	Per Block	Additional staff sanctioned			Total staff in position as on 30th June		
			as on 30th June	1963	1964	1965	1963	1964
1	2	3	4	5	6	7	8	9
<b>A. Block Level :</b>								
1. Agricultural Extension Officer		4	76	78	78	68	69	67
2. Village Level Worker		10	180	180	180	173	176	170
3. Cooperative Extension Officer		1	19	19	19	19	19	18
4. Cooperative Supervisor		2	38	38	38	37	36	36
<b>B. District Level :</b>								
1. Project Officer		—	1	1	1	1	1	1
2. Subject-matter Specialist		—	4	4	4	4	3	4
3. Asstt. Distt. Registrar		—	1	1	1	1	1	1
<b>C. Agricultural Information :</b>								
1. Agril. Information Officer		—	—	1	1	—	1	1
2. Photographer		—	—	1	1	—	—	—
3. Artist		—	—	1	1	—	—	—
<b>D. Soil Testing Laboratory :</b>								
1. Asstt. Soil Chemist		—	—	1	1	—	—	—
2. Junior Assistant		—	—	2	2	—	1	2
3. Laboratory-keeper		—	—	2	2	—	—	1
<b>E. Implement Workshop :</b>								
1. Agricultural Engineer		—	—	1	1	—	—	1
2. Asstt. Agril. Engineer		—	—	1	1	—	1	1
3. Junior Mechanic		—	—	2	2	—	—	1
<b>F. Water Use &amp; Management :</b>								
Agricultural Engineer		—	—	1	1	—	—	—
2. Overseer		—	—	2	2	—	1	2
3. Agricultural Asstt.		—	—	4	4	—	2	4

ANNEXURE 19.3 (*Continued*)

1	2	3	4	5	6	7	8	9
<b>G. Scheme for Tractor Ploughing:</b>								
1. Foreman Supervisor	—	—	1	1	—	—	1	
2. Mechanic	—	—	2	2	—	—	2	
3. Tractor Driver	—	—	10	10	—	6	6	
4. Asstt. Tractor Driver	—	—	10	10	—	—	5	
<b>H. Scheme for Levelling of Land</b>								
1. Foreman Supervisor	—	—	1	1	—	1	1	
2. Mechanic	—	—	1	1	—	1	1	
3. Bull-dozer Operator	—	—	5	5	—	2	2	
4. Asstt. Bull-dozer Operator	—	—	5	5	—	2	2	
5. Motor Truck Driver	—	—	1	1	—	1	1	
<b>I. Benchmark Survey:</b>								
1. Asstt. Statistician	—	1	1	1	1	1	1	
2. Agril. Officer	—	1	1	1	1	1	1	
3. Jr. Statistical Asstt.	—	1	1	1	1	1	1	
4. Agril. Supervisor	—	—	1	1	—	1	1	
5. Investigator	—	9	9	10	9	9	10	

## ANNEXURE 19.4

*Percentage area under different crops for different holding size groups in Surat district*

Name of crop	Small size holdings (upto 2 hectares)	Medium size holdings (2-4 hectares)	Large size holdings		Pooled over all holdings	
	1	2	3	4 (4-8 hectares)		
Paddy		36	20	20	13	20
Jowar		16	22	17	19	18
Pulses		13	11	9	9	10
Other foodgrains		7	11	12	9	10
Total foodgrains		72	64	58	50	58
Cotton	14	20		23	31	24
Groundnut	7	9		9	12	10
Other cash crops	2	2		2	3	3
Total cash crops	23	31		34	46	37
Grass and fodder	2	2		4	1	3
Other crops	3	3		4	3	2
Total—all crops	100	100		100	100	100

**ANNEXURE 19.5**  
*Percentage area under the various crops benefited by different manures and fertilizers and their average rates of application in Surat district.*

Crop/Kind of organic manure or chemical fertilizer	Percentage area benefited			Average rate of application in quintals per hectare			Recommended rates of application in kg. per hectare		
	Size of the holding			Size of the holding					
	Small	Medium	Large	Very large	Pooled	Small	Medium	Large	Pooled
1	2	3	4	5	6	7	8	9	10
<i>Paddy—</i>									12
F.Y.M. or Compost	67	78	62	65	67	105.36	112.08	67.44	50.87
Green manure	7	13	8	18	11	†	†	†	†
Nitrogenous fertilizers (in terms of Ammonium sulphate)	13	24	12	23	17	1.55	1.07	1.27	0.90
Phosphatic fertilizers (in terms of Super-phosphate)	3	10	4	4	5	1.30	1.12	0.79	0.13
<i>Jowar—</i>									
F.Y.M. or Compost	57	42	33	36	39	70.25	90.76	25.74	11.95
Green manure	0	*	2	6	2	†	†	†	†
Nitrogenous fertilizer (in terms of Ammonium sulphate)	4	5	2	4	4	0.76	0.71	0.53	1.30
Phosphatic fertilizers (in terms of Super-phosphate)	0	2	3	2	2	—	0.42	0.26	0.14
<i>Cotton—</i>									
F.Y.M. or Compost	54	46	40	40	63.35	72.97	57.75	46.22	59.8
Green manure	0	4	3	12	7	†	†	†	†
Nitrogenous fertilizers (in terms of Ammonium Sulphate)	7	9	7	9	7	0.38	0.79	0.52	1.48
Phosphatic fertilizers (in terms of Super-phosphate)	3	1	1	2	2	0.13	0.43	0.07	0.96

\* Percentage to the total less than 0.5.  
 † Information collected is incomplete.

ANNEXURE 19.6  
*Average yield in quintals per hectare in Surat district and comparable areas*

Crop	Year	Surat District			Control Area			Adjoining districts** excluding Surat			Gujarat State
		Area in '00 hectares	No. of experiments	Average yield	Standard error	Area in '00 hectares	No. of experiments	Average yield	Standard error	Adjoining districts**	
1	2	3	4	5	6	7	8	9	10	11	12
Rice†	Average for 3 years										
	1959-62	1221		11.8						10.7	6.2
	1962-63	1228	406	11.8	0.30					9.6	5.6
	1963-64	1253	352	12.4	0.28					13.0	7.9
	1964-65	1378	419	13.4	0.27					12.5	7.0
	Average for 3 years										
	1962-65	1360	1177*	12.9	0.16					11.7	6.8
Jowar	Average for 3 years										
	1959-62	788		4.1						6.2	1.2
	1962-63	782	388	9.6	0.30	223	72	9.5	0.94	4.9	2.3
	1963-64	819	359	8.0	0.28	168	71	9.5	0.82	5.4	1.9
	1964-65	764	365	8.4	0.30	168	72	6.5	0.40	4.3	2.1
	Average for 3 years										
	1962-65	760	1112*	8.7	0.17	186	215*	8.5	0.43	4.9	2.1
Cotton (lint)	Average for 3 years										
	1959-62	1559		1.1						1.1	1.2
	1962-63	1531	373	1.6	0.04	632	67	1.9	0.13	1.9	1.7
	1963-64	1458	352	1.1	0.04	657	72	1.3	0.09	1.6	1.4
	1964-65	1495	373	1.0	0.04	622	70	1.2	0.09	1.2	1.4
	Average for 3 years										
	1962-65	1495	1098*	1.2	0.02	637	209*	1.5	0.06	1.6	1.5

\* Pooled over all years.

\*\* Broach and Dangs (Gujarat State); West Khandesh (Dhulia), Nasik and Thana (Maharashtra State).

† No suitable control blocks for rice crop were available in the neighbourhood of the district.

## ANNEXURE 19.7

*Estimated production of the principal crops in '00 tonnes and its total value in Surat district*

Year	Rice	Jowar	Cotton (lint)	Value of total production (Rs. in lakhs) for	
				Rice + Jowar	Rice + Jowar + Cotton (lint)
1	2	3	4	5	6
Average for 3 years 1959-62	1443	323	168	1062	1614
1962-63	1449	751	243	1234	2039
1963-64	1813	655	160	1432	1958
1964-65	1846	642	150	1449	1942
Average for 3 years 1962-65	1703	683	185	1372	1980
Percentage increase or decrease in average production for the years 1962-65 over 1959-62	+18.0	+111.4	+10.1		
Percentage increase or decrease in the State average production for the years 1962-65 over 1959-62	+14.3	+75.3	+24.8		

*Note :— Value of total production was worked out on the basis of the harvest prices  
in 1960-61.*

## ANNEXURE 19.8

*Yield rates of different crops, separately for participant and non-participant cultivators in Surat district*

Crop	Year	Percentage of participant cultivators	Average yield in quintals per hectare	
			Participants	Non- participants
1	2	3	4	5
Rice	1962-63	15	14.1	11.2
	1963-64	33	16.2	13.3
	1964-65	31	15.6	13.3
Jowar	1962-63	17	11.7	9.8
	1963-64	20	10.5	8.8
	1964-65	32	10.1	7.6
Cotton (Lint)	1962-63	17	1.7	1.7
	1963-64	23	1.2	1.1
	1964-65	37	1.1	1.0

## ANNEXURE 19.9

*Percentage distribution of rice-fields sampled in Surat district for different combinations of practices—Irrigation (I), Manure (M) and Fertilizer (F) and their average yields in quintals per hectare.*

Practices followed	1962-63			1963-64			1964-65			Pooled over all the years		
	No. of fields	% to the total	Avg. yield	No. of fields	% to the total	Avg. yield	No. of fields	% to the total	Avg. yield	No. of fields	% to the total	Avg. yield
I	2	3	4	5	6	7	8	9	10	11	12	13
I M F	13	5	16.6	11	4	17.4	19	7	17.6	43	5	17.2
I M O	15	5	11.4	9	3	15.2	7	2	17.3	31	4	13.8
I O F	0	0	—	2	1	†	0	0	—	2	*	†
I O O	†	1	*	†	*	†	0	0	—	2	*	†
Total	29	10	13.5	23	8	15.8	26	9	17.5	78	9	15.8
O M F	44	14	16.5	46	16	17.6	66	23	16.5	156	18	16.8
O M O	140	46	12.0	147	51	14.3	124	43	14.1	411	46	13.5
O O F	2	1	†	10	3	11.8	12	4	16.0	24	3	14.1
O O O	89	29	8.1	62	22	11.1	60	21	9.1	211	24	9.3
Total	275	90	11.5	265	92	14.0	262	91	13.6	802	91	13.1

\* Percentage to the total, less than 0.5.

† Average yield has not been given since the observations were few.

ANNEXURE 19.10

*Percentage distribution of fields sampled in Surat district according to source of seed used and average yield in quintals per hectare for each source*

Source of seed	1962-63			1963-64			1964-65			Pooled over all years		
	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield
1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Rice</i>												
Own source	249	82	11.8	267	93	14.1	256	90	14.0	772	88	13.3
Cooperative society/Govt.	13	4	15.5	31	5	16.0	11	4	14.1	37	4	15.3
Regd. seed grower	0	0	—	0	0	—	2	1	†	2	*	†
Others	42	14	9.9	7	2	13.9	15	5	12.2	64	8	10.9
<i>Jowar</i>												
Own source	246	85	9.7	256	89	9.2	223	86	8.2	725	87	9.1
Cooperative society/Govt.	22	8	13.8	15	5	10.6	14	5	13.2	51	6	12.7
Regd. seed grower	1	*	†	3	1	†	2	1	†	6	1	13.0
Others	21	7	11.4	14	5	9.0	20	8	7.4	55	6	9.3

\* Percentage to the total, less than 0.5.

† Average yield has not been given for less than 5 observations.

## CHAPTER XX

### SAMBALPUR (ORISSA)

#### I

20.1 The district has a total area of 17.50 thousand square kilometres and a population of 15.1 lakhs, of which about 92 per cent is rural. The average density of population is 86 persons per square kilometre, as against 244 for the State as a whole. The district is delimited into 29 community development blocks, having 3426 villages and 3,21,068 farm families. The railways serve a very small portion of the district and cover barely 160 kilometres of its territory. A fairly intensive network of metalled and unmetalled roads connect the district town with the sub-divisional head-quarters and the important places of the neighbouring districts. The communication facilities in the rural areas are extremely unsatisfactory, particularly in the rainy season.

20.2 The annual rainfall of the district is about 157.5 cm. most of which occurs during the months of June to September. The topography of the district is undulating and the cultivated lands consist of ridges, slopes, dells and bottoms. Alluvial soils occur by the side of the rivers and streams while at the ridges the soils are sandy to sandy loam.

#### *Land Utilisation*

20.3 Only about 41 per cent of the total geographical area is under cultivation. The total gross cropped area of the district in 1961-62 is 7.84 lakh hectares of which 3.38 lakh hectares or 43 per cent is irrigated. The main sources of irrigation are tanks or artificial water reservoirs and wells. The Hirakud canals irrigate about 52.5 per cent of the irrigated area. Annexure 20.1 gives the land utilisation data for the district for the three years ending 1961-62.

#### *Cropping pattern*

20.4 Foodgrains cover 66 per cent of the gross cropped area of which paddy alone accounts for about 97 per cent. Paddy, as a rule, is grown in the comparatively low lying areas, while the upland tracts are generally sown with pulses and oilseeds. As a result of the peculiar configuration of the land, the small size of holdings and the uneven distribution of rainfall, rotation of crops and double cropping is hardly practised. The dependence of most of the farms on a single crop makes their condition precarious in the event of a crop failure which is not an uncommon experience in the district. Annexure 20.2 shows the area, production and yield per hectare of food-

grains and major commercial crops before the inception of the Package Programme.

#### *Land Tenure*

20.5 Before the abolition of *zamindari* and various other forms of intermediary rights in 1962, there were four different kinds of estates in this district, namely *gaontali*, *malguzari*, *zamindari* and *ryotwari*. After the abolition of the *zamindari* and other estates, the question of tenure has lost much of its importance. The estates are now managed by Government through its officers and the village *gaontia* collects revenue on behalf of the Government. There are four kinds of tenants viz. absolute occupancy tenant, occupancy tenant, ordinary tenant and village service tenant. In Sambalpur district, however, there is no absolute occupancy tenancy. Occupancy and ordinary tenants possess land that is inheritable and are entitled to sublet and transfer it by sale or mortgage. Village service tenants are in possession of the land only when in actual service; their land is non-transferable but passes to the successor in office. The area owned and self-cultivated accounts for about 61 per cent of the total cropped area in the district, while the area leased on kind rent and that on crop sharing comprises only about 4 and 3 per cent respectively. For leased land, on the other hand, the rent is unusually high and varies according to the dictates of the leaser. The rent to be paid for owned land is very small and does not change from year to year. The amount of rent in kind varies from 1 to 3 quintals of paddy per hectare. Under the crop-sharing system, the owner of land usually pays the rent as well as half of the seed required and gets half of the yield as his share. From the point of view of net return, the cultivation of leased land as compared to owned land is disadvantageous to the farmers.

20.6 Abolition of under-tenures, revenue-free estates and '*inams*' is under way. Under the Orissa Land Reforms Act, 1960 (not yet enforced, pending finalisation of certain important amendments to the Act) it is provided that a landlord who holds more than 15 standard acres under personal cultivation may resume 2/3rds of the area leased to tenants and if he holds 15 standard acres or less he is entitled to resume 3/4ths of the leased area. A landlord is required to give notice of resumption to the tenant within three months from a date to be notified. Pending enactment of the Amendment Bill, the stay of enactment provided under the Tenants Relief Act, 1955 has been continued.

20.7 According to the existing law, produce rent is not to exceed 1/4th of the gross produce or value thereof except in cases where the landlord meets the whole or any part of the cost of cultivation.

20.8 The Orissa Land Reforms Act provides for transfer of ownership to tenants whose names are entered in the record of rights. With effect

from the date of enforcement of the Act, such *under-raiayats* will be required to pay compensation for the acquisition of ownership equal to 50 per cent of the market value of land. They will be required to pay fair and equitable rent not exceeding 1/8th of the produce. Leasing is prohibited in future and the tenants (share-croppers) will not have the right to sublet. The Act provides for ceiling on future acquisition as well as on existing holdings.

#### *Administrative Arrangements*

20.9 The additional staff sanctioned for the programme at the district level consists of 1 Project Officer, 6 Subject-matter Specialists, 1 Assistant Registrar, Cooperative Societies and 1 Marketing Officer.

20.10 The entire staff which had been sanctioned up to 30th June 1965 was mostly in position except for 12 posts of Agricultural Extension Officer, 15 posts of VLW, 7 posts of Assistant Block Development Officer, 11 posts of Cooperative Extension Officer, 1 post of Seed Development Inspector and 2 posts of Investigator for Benchmark Survey. The post of Water Use and Management Specialist, which was sanctioned recently, had yet to be filled up. The staff for the scheme of Agricultural Information Unit, Agricultural Implement Workshop, Soil Testing Laboratory and Quality Seed Programme was appointed mostly during 1962-63.

20.11 The additional staff sanctioned per block consisted of 1 Agricultural Extension Officer and 1 Extension Officer (Cooperation) and 10 VLWs.

20.12 Annexure 20.3 shows the position in respect of the appointment of additional staff.

20.13 A State Level Coordination Committee has been set up under the chairmanship of the Additional Development Commissioner. The District Level Coordination Committee has been set-up under the chairmanship of Revenue Divisional Commissioner.

#### *Coverage*

20.14 The programme was initiated in kharif 1962-63 in 759 villages spread over 15 blocks and extended to 862 villages during 1963-64, without any addition in the number of blocks. In the year 1964-65, the programme covered 23 out of 29 blocks and 1802 out of the total of 3426 villages. The area covered under the programme increased from 0.24 lakh hectares in 1962-63 to 0.51 lakh hectares in 1963-64 and to 0.52 lakh hectares in 1964-65 which comprised 3 per cent of the cultivated area in the district in 1962-63 and 7 per cent each in 1963-64 and 1964-65. The number of farm plans prepared has increased from 0.23 lakh in 1962-63 to 0.29 lakh in 1963-64 and to 0.46 lakh in the year 1964-65, representing 7 per cent, 9 per cent and 14 per cent respectively of the total number of cultivating families in the district.

### *Fertilizers*

20.15 Prior to the inception of the programme the offtake of both nitrogenous and phosphatic fertilizers taken together in the district was more or less static around 1300 tonnes. The total offtake of both these fertilisers went up to over 3500 tonnes in 1962-63 and 5718 tonnes in 1963-64 and reached the level of 8371 tonnes during 1964-65. While the offtake of chemical fertilizers in the pre-package days used to be about 80 per cent during kharif and 20 per cent in rabi, the quantum of offtake during 1962-63 was nearly equal in both the seasons and has been at a higher level during the current year. Fertilizers are distributed through *grain gola* cooperative societies as agents of the District Marketing Society. The table below gives the distribution of fertilisers in the district.

*Fertilizer Distribution in Tonnes*

Year	Nitrogenous fertilisers (in terms of Ammon. sulphate)	Phosphatic fertili- scrs (in terms of Super phosphate)
1961-62 (Pre-package)	816	502
1962-63	1731	1760
1963-64	2783	2935
1964-65	4619	3752

20.16 The offtake of nitrogenous fertilizers has gone up by 566 per cent and that of phosphatic fertilizers by 747 per cent during the period 1961-62 to 1964-65.

20.17 Chemical fertilizers are distributed by 113 depots, about 50 per cent of which have 2 to 3 subsidiary depots as against 84 depots at the inception of the programme. The offtake of fertilisers would have increased much more but for lack of transport facilities and the limited storage capacity in the existing godowns in the district.

### *Improved Seeds*

20.18 A special programme for production and distribution of quality seeds has been initiated in the district for supplementing the normal seed production programme. Paddy seeds are supplied through *grain gola* cooperative societies which receive foundation seeds from the Agriculture Department and follow a systematic scheme of seed saturation. The quantity of improved seeds distributed has increased from 229 tonnes in the year 1962-63 to 935 tonnes in 1964-65.

*Pesticides and Plant Protection*

20.19 Steps have been taken to stock plant protection equipment and supplies in the required quantities at various depots operated by *gram panchayats* for timely use. The progress of plant protection measures is shown in the table below:

Year	Area treated	Seed treated	Pesticide formulations used.
	(hectares)	(tonnes)	(tonnes)
1961-62 (Pre-package)	17,806	44	159
1962-63	47,753	154	168
1963-64	59,894	1,097	218
1964-65	33,589	1,196	258

*Improved Implements*

20.20 A building for the implements workshop was acquired and steps are underway to equip it. This workshop is engaged in producing and demonstrating improved implements suited to local conditions besides undertaking manufacture of proto-types and training of village artisans and farmers in the use, maintenance and repair of implements. A large number of paddy weeders and ploughs was distributed through the regional marketing societies at 50 per cent subsidy.

*Demonstrations*

20.21 The number of composite demonstrations laid on cultivators' fields have increased from 865 in the year 1962-63 to 1940 in 1963-64 and 2571 in 1964-65.

20.22 These demonstrations have shown substantial increase in yield rates on demonstration plots as compared to 'control' plots. The average increase in yield of paddy during both kharif 1963-64 and kharif 1964-65 was 43 per cent in demonstration plots compared to that in control plots. In 1962-63 the average increase in yields on demonstration plots over the control plots was 47 per cent. The average income due to adoption of the package of practices was Rs. 1.91 against an investment of a rupee on improved practices.

*Soil Testing*

20.23 The existing soil testing laboratory at Sambalpur has been remodelled and has now a capacity to handle 30,000 samples a year. The soil test recommendations are also followed up in the field by the Agricul-

tural Extension Officers and the Village Level Workers. The soil testing laboratory analyses samples received both from Sambalpur and other districts of the State. The progress in soil testing of samples collected from the district is indicated in the following table.

Year	Samples collected	Samples tested	Recommendations made
1963	2882	2882	2882
1964	3535	3535	3535

#### *Co-operative Credit and Marketing*

20.24 There were 594 cooperative credit societies in the district in the year 1961-62 with a membership of 0.45 lakh and a share capital of Rs. 20.45 lakhs. During 1963-64 the number of societies came down to 173 with a membership of 87,632. Though the membership remained more or less firm, the number of societies got reduced further to 133 in 1964-65. The reduction in the number of societies was mainly due to their re-organisation under an action-programme recommended by the Ministry of Community Development & Cooperation, Government of India. The share capital of these societies witnessed a rise from Rs. 20.45 lakhs in 1961-62 to Rs. 24.66 lakhs in 1963-64 but dropped to Rs. 20.91 lakhs in the following year. The trend in deposits with these societies was similar. As compared to the pre-package level of Rs. 9.08 lakhs, the deposits rose to Rs. 10.62 lakhs during the year 1963-64 and then dropped to Rs. 7.62 lakhs in 1964-65. The percentage of over-dues increased from 33 in 1961-62 to 36 in 1962-63 due to drought conditions prevailing in the district in the latter year and further to 48 in 1964-65.

20.25 Loans in kind (fertilisers and seeds) are given interest-free to be repaid by scheduled dates and only in case of default, interest is charged from the date of disbursement. But other loans in kind are not interest-free. The cultivators are given the option of repaying kind loans in terms of produce at price fixed by Government.

20.26 On account of the unsatisfactory crop situation, a number of societies which were defaulters in the rabi season of 1961-62 and therefore, not eligible for credit, were advanced fertilisers and seeds on a deferred payment basis to meet the needs of their member-cultivators who participated in the programme. The non-defaulter members of defaulting societies were allowed loans without any reference to the percentage of collection of society. Members who defaulted on account of crop failure were allowed credit to the extent of fertiliser requirement provided the default did not exceed a period of 12 months from the due date.

20.27 The maximum credit limit of Rs. 600 for every individual was raised to Rs. 2000 from the very inception of the programme. An effective link between credit and supplies had been established and all supply requirements of the package participants were issued in kind, the value thereof being adjusted against the loans sanctioned to the society by the Central Bank.

20.28 There is one Central Bank in the district. Between 1961-62 to 1963-64 the membership of the bank declined from 916 to 700 while the share capital increased from Rs. 12.35 lakhs to Rs. 18.08 lakhs. The deposits with the bank had been steadily increasing during these years from Rs. 41.20 lakhs in the year 1961-62 to Rs. 41.97 in 1962-63 and Rs. 53.00 lakhs in 1963-64. The amount of loans advanced also showed a rise from Rs. 51.36 lakhs in 1961-62 to Rs. 57.29 lakhs in 1963-64.

20.29 The Central Bank introduced seasonality in loaning operations for disbursing loans from March to June for kharif and from September to December for rabi. The due dates for repayment were fixed as 31st March for kharif and 15th July for rabi. As the production plans are not being completed by the 31st March, the Central Bank resolved to disburse cash loans from 15th April.

20.30 A scheme for linking of credit with marketing by recovering paddy against the loan advanced had been drawn up since the 1962-63 harvest season, but on account of widespread crop failure because of drought, the scheme did not make any progress. However, during the year 1963-64 the programme was implemented in 49 out of 84 societies in the IADP areas. All the regional marketing societies undertook purchase of paddy at the time of harvest for the discharge of loans from the borrowings of credit societies. During the year 1963-64, these societies marketed agricultural produce valued at Rs. 5.13 lakhs and got adjusted Rs. 2.68 lakhs to the Central Bank towards the dues of credit societies. Though the value of agricultural produce marketed by these societies during 1964-65 increased to Rs. 7.03 lakhs, recoveries effected were negligible.

20.31 In the processing sphere, 3 rice-cum-oil mills were completed while 4 more units were sanctioned and would be established in the course of a year. A number of rice huller units had been sanctioned and some of them installed. A cooperative sugar mill had been set up at Attabira. These measures are intended to strengthen the marketing aspect with regard to rice, groundnut and sugarcane, the major crops of the district.

#### *Storage godowns*

20.32 A large number of rural godowns of 50 tonnes capacity each are under construction in order to enable the farmers to get supplies within their easy reach. As against 353 godowns needed to saturate the district, 183 godowns existed in June '64, while 27 were under construction. During

the year 1964-65, 58 godowns were added to the number existing last year, bringing the total number of godowns to 241 at the end of June 1965.

## II

### *Results of Agronomic and Agro-economic Survey 1962-63.*

20.33 Agronomic and agro-economic survey in the district was initiated in the year 1962-63 and since then it is being repeated annually. Each year a random sample of about 1140 cultivators' holdings spread over 144 villages were selected for the collection of data. The survey was also carried out in the control areas consisting of 5 blocks, namely, Sundargarh in Sundargarh district, Binka, Bolangir and Titligarh in Bolangir district and Junagarh in Kalahandi district. In this section, the results relating to the enquiry conducted during 1962-63 are discussed.

#### *Holding size*

20.34 Cultivators falling in the sample were classified into four categories according to the size of their holdings. The proportion of cultivators falling in the four groups, the area cultivated by them and the average size of the holdings are given in the table below :

	Holding size			
	Very small (upto 1 hectare)	Small (1-2 hectares)	Medium (2-4 hec- tares)	Large (above 4 hectares)
Percentage of the cultivators in the group to the total	37	29	19	15
Average size in hectares	0.5	1.4	2.9	7.6
Percentage of the cultivated area for the group to the total	9	16	24	51

About two-thirds of the cultivators were having holdings less than two hectares in size; area covered by these holdings was about one-fourth of the total cultivated area. About one-seventh of the cultivators had holdings greater than four hectares which accounted for about half of the total cultivated area. 19 per cent had holdings between two to four hectares. The average size of holding varied from 0.5 to 7.6 hectares for different holding size groups. The average size of holding for the district was 2.3 hectares.

*Cropping pattern*

20.35 The cropping pattern for the different size groups of the holdings is given in Annexure 20.4. The cropping pattern followed in different size groups was nearly the same. The area devoted to the foodgrains was of the order of 95 per cent of the total cultivated area in different size groups. The area under rice was about 90 per cent and under pulses, it ranged from 4 per cent for large size holding to 8 per cent for medium size holding. Cash crops were sown on 2 per cent to 4 per cent of the area.

*Facilities for the supplies of inputs and marketing*

20.36 Improved seeds of paddy and chemical fertilizers like nitrogenous fertilizers were the chief production supplies received by the cultivators. About 17 per cent of the cultivators took seeds distributed by the cooperatives and other agencies. This facility was availed of relatively to a larger extent by the cultivators of very small holdings. The average quantity taken by a recipient cultivator was 86 kg. About 13 per cent of the cultivators availed of the facility of the supply of chemical fertilizers. The average quantity of nitrogenous fertilizers taken by the cultivators ranged from 30 kg. for small size holding to 115 kg. for large size holding. The quantity taken by a cultivator per hectare decreased with the holding size for improved seeds as well as nitrogenous fertilizer. In respect of improved seeds, it decreased from 112 kg. to 20 kg. per hectare while for nitrogenous fertilizer, the corresponding decrease was from 124 kg. to 15 kg.

20.37 The survey indicated that the facilities for the supply of production requisites like improved seeds and fertilizers were available to about 60 per cent of the sampled villages either inside the village or in its neighbourhood. In respect of other production supplies, such facilities were available for about 40 per cent of the villages. In general, the production supplies were distributed through cooperative societies but private agencies also played an important role for their distribution. About 60 per cent of the farmers disposed of their foodgrain surplus in marketing-yards located at reasonable distance from the village. The rest of the cultivators disposed of their produce to local merchants.

*Use of manures and fertilizers*

20.38 The percentage of the cultivators using farm-yard manure was of the order of 80 per cent in the district. The percentage of the cultivators applying chemical fertilizer alone or in combination with organic manure was very small (less than 10 per cent) during both the seasons. The proportion of the cultivators using chemical fertilizers in the Kharif season increased from 4 per cent in the very small holding to 21 per cent in large holding size group. During the rabi season, no such association was observed.

20.39 Chemical fertilizers were generally applied to paddy, sugarcane and groundnut crops. The total quantity of nitrogenous fertilizer distributed was of the order of about 1700 tonnes in the district. About 90 per cent was consumed by paddy and 2 per cent by sugarcane while remaining was applied to a variety of other crops. About 1800 tonnes of phosphatic fertilizer were distributed in the district. It is estimated that the entire quantity of the fertilizer was consumed by paddy alone.

*Percentage area benefited and rate of application*

20.40 The percentage area benefited by different manures and fertilizers and their rates of application according to holding size for autumn and winter paddy are presented in Annexure 20.5. It may be seen that more than 70 per cent of the area was benefited by F.Y.M. for both the paddy crops. The percentage area benefited by nitrogenous fertilizers for both the paddy crops was small, being of the order of 2 per cent and 3 per cent for autumn and winter paddy respectively. The rates of application for nitrogenous fertilizer were the same for both the crops, being 92 kg. per hectare as against the recommended dose of 188 kg. per hectare. No association with the holding size was observed for the percentage area benefited as well as the rates of application. The percentage area benefited by phosphatic fertilizer was small for all the crops.

20.41 The consumption level of chemical fertilizer was very low even during the year 1964-65; less than 10 per cent of the potential requirements (to saturate the entire paddy area with the recommended rate) of the nitrogenous and phosphatic fertilizers was consumed in the district.

III

*Results of crop-cutting surveys, 1962-65*

20.42 Crop-cutting surveys are being conducted every year since 1962-63 on autumn and winter paddy crops in the district as well as in its control areas. The results of the surveys conducted during the years 1962-65 are presented in Annexures 20.6 to 20.9.

20.43 It may be seen from the Annexure 20.6 that there was an increasing trend in the yield rate for the paddy crop taken as a whole during 1962-63 to 1964-65 in Sambalpur district as well as in the rest of the State. For both the crops, the year 1962-63 was the worst during the period under study. During the year 1963-64, the position improved and for the two crops of paddy viz., autumn and winter, the yield rates were about 8 and 14 quintals per hectare respectively. During the year 1964-65, the position did not further improve and the yield rates remained more or less at the same level as in the previous year. The position was similar in the control areas too.

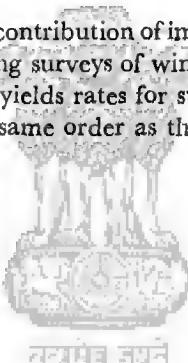
*Participants vs. non-participants*

20.44 Percentage of participant cultivators was 6 for autumn as well as winter rice in the year 1962-63 and this increased to 13 and 18 respectively for the two crops during 1964-65 (Annexure 20.8). For autumn rice, the yield rates of participants and non-participants did not differ significantly. In respect of winter crop, participant cultivators obtained, on an average, yield of one to two quintals per hectare more than non-participant cultivators in the same years.

*Combination of agronomic practices and yield rates*

20.45 Annexure 20.9 shows the average yield of autumn and winter paddy according to different combinations involving irrigation, manures and fertilizers. It may be observed that the fields receiving fertilizers showed higher yields than those not receiving fertilizers; in fertilized fields, the yield of rice (autumn) during 1964-65 was found to be about 45 per cent higher than that of un-fertilized fields, while in the case of rice (winter), it was about 30 per cent.

20.46 As regards the contribution of improved seeds, about one-fifth of fields selected for crop-cutting surveys of winter rice were found to be sown with improved seeds. The yields rates for such fields sown with improved seeds, however, were of the same order as those in the fields sown with local seeds.



## ANNEXURE 20.1

*Land Utilisation and Irrigation, Sambalpur (Orissa)*

(00 Hectares)

S. No.	Type of area according to use	1954-55	1960-61	1961-62	Average
1	2	3	4	5	6
1.	Geographical area	17,526	17,486	17,486	17,499
2.	Forest	5,164	2,966	2,966	3,699
3.	Barren & uncultivable land	1,624	2,027	2,027	1,893
4.	Land put to non-agricultural uses including home-steads, grave yards, roads, canals, lakes etc.	827	1,635	1,635	1,366
5.	Cultivable waste	1,285	1,283	1,283	1,284
6.	Permanent pasture and other grass lands	692	733	733	719
7.	Land under miscellaneous tree crops and groves not included in the net area sown	97	97	97	97
8.	Current fallows	574	1,473	1,473	1,173
9.	Fallow land other than current fallows	166	174	174	171
10.	Net area sown	7,097	7,098	7,098	7,098
11.	Net area sown expressed as per cent of geographical area	41	41	41	41
12.	Area sown more than once	125	692	737	518
13.	Area sown more than once expressed as per cent of net area sown	2	10	10	7
14.	Gross cropped area	7,222	7,790	7,835	7,616
15.	Net irrigated area	1,144	2,647	2,663	2,151
16.	Gross irrigated area	1,144	3,339	3,375	2,619
17.	Net irrigated area expressed as per cent of net area sown	16	37	38	30
18.	Gross irrigated area expressed as per cent of gross cropped area	16	43	43	34

*Note:* Figures from 1955-56 to 1959-60 are not available.

ANNEXURE 20.2  
*Estimates of Area, Production and Yield of Major Crops—Sambalpur (Orissa)*

Crop	Area (Hectares)					Production (Metric tons)					Yield (Quintals per hectare)					
	1959-60		1960-61		1961-62		1959-60		1960-61		1961-62		Average 1959-62			
	1	2	3	4	5	6	7	8	9	10	11	12	13			
1. Rice	483431	500832	460800	488354	428988	497263	432427	452693	8.87	9.93	8.99	9.3				
2. Jowar	162	162	162	162	45	45	45	45	45	2.78	2.78	2.78	2.8			
3. Bajra	16	16	16	16	7	7	7	7	7	4.38	4.38	4.38	4.4			
4. Maize	728	728	728	728	336	336	336	336	336	4.62	4.62	4.62	4.6			
5. Ragi	486	486	486	486	224	224	224	224	224	4.61	4.61	4.61	4.6			
6. Small Millets	10400	10400	10400	10400	4796	4796	4796	4796	4796	4.61	4.61	4.61	4.6			
7. Wheat	1214	1214	1214	1214	631	631	631	631	631	5.20	5.20	5.20	5.2			
8. Total cereals	496337	513838	493806	501360	433027	503302	438466	458932	8.76	9.79	8.88	9.2				
9. Gram	1497	1497	1497	1497	297	297	297	297	297	1.98	1.98	1.98	2.0			
10. Tur.	202	202	202	202	50	50	50	50	50	2.48	2.48	2.48	2.5			
11. Groundnut	4411	4411	4411	4411	4983	4983	4983	4983	4983	11.30	11.30	11.30	11.3			
12. Castor	607	607	607	607	194	194	194	194	194	197	3.20	3.20	3.20	3.2		
13. Sesamum	10117	10117	10117	10117	2351	2351	2351	2351	2351	2.32	2.32	2.32	2.3			
14. Rape & Mustard	728	728	728	728	419	419	419	419	419	5.76	5.76	5.76	5.8			
15. Linseed	81	81	81	81	15	15	15	15	15	1.85	1.85	1.85	1.9			
16. Total oil seeds	15944	15944	15944	15944	7962	7962	7962	7962	7962	4.99	4.99	4.99	5.0			
17. Sugarcane	3521	3521	3521	3521	7134	7134	7134	7134	7134	20.26	20.26	20.26	20.3			
18. Cotton	243	283	283	270	10	82	82	82	82	58	0.41	2.90	2.90	2.2		

## ANNEXURE 20.3

*Additional Staff Sanctioned and in Position for IADP, Sambalpur*

S. No.	Category	Additional Staff Sanctioned			Additional Staff in position		
		Per block	Total as on 30th June		Total as on 30th June		
			1963	1964	1965	1963	1964
1	2	3	4	5	6	7	8
<i>A. Block Level:</i>							
1.	Agricultural Extension Officer	1	15	23	23	15	23
2.	Village Level Worker	10	150	150	230	111	118
3.	Cooperative Extension Officer	1	15	23	23	11	12
<i>B. District Level:</i>							
1.	Project Leader	—	1	1	1	1	1
2.	Subject-matter Specialist	—	3	3	3	3	3
3.	Asstt. Registrar	—	1	1	1	1	1
4.	Marketing Officer	—	1	1	1	1	1
<i>C. Agricultural Information Unit:</i>							
1.	Agril. Information Officer	—	1	1	1	1	1
2.	Asstt. Information Officer	—	1	1	1	1	1
3.	Photographer/Projectionist	—	1	1	1	1	1
4.	Artist	—	1	1	1	1	1
<i>D. Agricultural Implements Workshop:</i>							
1.	Agricultural Engineer	—	1	1	1	—	—
2.	Asstt. Agri. Engineer	—	1	1	1	1	1
<i>E. Soil Testing Laboratory:</i>							
1.	Soil Chemist	—	—	1	1	—	1
2.	Research Asstt.	—	2	2	2	2	2
3.	Scientific Asstt.	—	1	1	1	1	1
<i>F. Quality Seed Programme:</i>							
1.	Seed Development Officer	—	—	1	1	—	1
2.	Seed Inspector	—	—	4	4	—	3

## ANNEXURE 20.3 (Continued)

1	2	3	4	5	6	7	8	9
<b>G. Benchmark Survey:</b>								
1. Statistical Officer	—	1	1	1	1	1	1	1
2. Statistical Asstt.	—	1	1	1	1	1	1	1
3. Statistical Supervisor	—	1	1	1	1	1	1	1
4. Investigator	—	2	2	2	2	—	—	—
5. Inspector	—	1	1	1	1	1	1	1
6. Computor	—	2	2	2	—	2	2	2

## ANNEXURE 20.4

*Percentage area under different crops for different holding size groups in Sambalpur district*

Name of crop	Very small		Small	Medium	Large	Pooled over all holdings
	1	2	3	4	5	6
Autumn paddy	52	41	42	43	43	43
Winter paddy	35	44	40	44	42	42
Summer paddy	2	2	3	3	3	3
Other foodgrains including pulses	8	9	10	5	7	
Total foodgrains	97	96	95	95	95	95
Sugarcane	1	1	1	1	1	1
Groundnut	1	1	2	2	2	2
Sesamum	—	1	1	1	1	1
Total cash crops	2	3	4	4	4	4
Other crops	1	1	1	1	1	1
Total—all crops	100	100	100	100	100	100

## ANNEXURE 20.5

*Percentage area benefited by fertilizers and manures and their average rates of application in different size groups of holdings in Sambalpur district.*

Crop/Kind of organic manure or chemical fertilizer	Percentage area benefited				Average rate of application in quintals per hectare					
	Very small holdings (less than 1 hect.)	Small size holdings (1—2 hect.)	Medium size holdings (2—4 hect.)	Large size holdings (above 4 hect.)	Pooled over all holdings	Very small holdings (less than 1 hect.)	Medium size holdings (1—2 hect.)	Large size holdings (above 4 hect.)	Pooled over all holdings	
	1	2	3	4	5	6	7	8	9	10
<b>A. Autumn Paddy</b>										
FYM or Compost	74	71	71	80	76	25.82	17.52	15.58	11.07	14.76
Nitrogenous fertilizers (in terms of Ammonium sulphate or equivalent)	2	2	1	2	2	1.06	1.31	1.45	0.46	0.92
Phosphatic fertilizers (in terms of Super-phosphate)	1	2	1	4	1	+	+	+	+	0.71
<b>B. Winter Paddy</b>										
FYM or Compost	77	72	73	72	72	28.68	22.70	35.79	15.22	22.41
Nitrogenous fertilizers (in terms of Ammonium sulphate or equivalent)	2	3	1	4	3	1.29	0.48	0.76	1.08	0.92
Phosphatic fertilizers (in terms of Super-phosphate)	1	3	1	3	3	+	+	+	+	0.76

+ Average rates not presented since the number of observations are less than 5.

## ANNEXURE 20.6

*Average yield of rice in quintals per hectare in Sambalpur district and comparable areas*

Crop	Year	Sambalpur district		Average yield in comparable areas		
		Average yield	Standard error	Control area	Adjoining districts*	State excluding Sambalpur
1	2	3	4	5	6	7
Rice (Autumn)	1962-63	4.1	0.22	4.1		
	1963-64	8.1	0.23	8.1		
	1964-65	8.2	0.36	6.1		
	Average for 3 years 1962-65	6.8	0.16	6.1		
Rice (Winter)	1962-63	7.7	0.27	5.7		
	1963-64	14.1	0.24	13.7		
	1964-65	13.5	0.32	12.9		
	Average for 3 years 1962-65	11.8	0.16	10.8		
Rice (Combined)	1959-62	9.3	—	N.A.	9.0	9.2
	1962-63	7.2	0.13	5.0	8.5	8.4
	1963-64	10.7	0.12	11.1	8.6	9.9
	1964-65	11.0	0.22	9.9	10.0	10.1
	Average for 3 years 1962-65	9.6	0.09	8.7	9.0	9.5

\* Bolangir, Dhenkenal, Kalahandi and Sundargarh.

**ANNEXURE 20.7**  
*Area, average yield and total production of rice in Sambalpur district and Orissa State*

Year	Sambalpur district					Orissa State		
	Area ('00 hectares)	Average yield (Q/H)	Production ('00 tonnes)	Value of production (Rs. in lakhs)*		Area ('00 hectares)	Average yield (Q/H)	Production ('00 tonnes)
1	2	3	4	5		6	7	8
Average for 3 years	1959-62	4867	9.3	4518	1767	40287	9.2	37093
	1962-63	5221	7.2	3759	1470	43760	8.3	36325
	1963-64	4910	10.7	5254	2055	42460	10.0	42480
	1964-65	5090	11.0	5599	2191	42710	10.2	43600
Average for 3 years	1962-65	5074	9.6	4871	1905	42977	9.5	40802
Percentage increase or decrease of average production for the years 1962-65 over 1959-62		+4	+3	+8	+8	+7	+3	+10

\*Value of production, worked out on the basis of State harvest prices for 1959-60.

**ANNEXURE 20.8**  
*Yield rates of different crops, separately for participant and non-participant cultivators, in Sambalpur district.*

Crop	Year	Percentage of participant cultivators	Average yield in quintals per hectare	
			Participants	Non-participants
1	2	3	4	5
Rice (Autumn)	1962-63	6	3.6	4.6
	1963-64	7	8.1	8.0
	1964-65	13	8.8	7.9
Rice (Winter)	1962-63	6	8.6	7.7
	1963-64	11	15.3	13.4
	1964-65	18	15.0	13.0

ANNEXURE 20.9

*Percentage distribution of fields sampled in Sambalpur district for different combinations of practices—Irrigation (I), Manure (M) and Fertilizer (F) and their average yields in quintals per hectare.*

Practices followed	Rice (Autumn)												Pooled over all the years No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield					
	1962-63			1963-64			1964-65																			
	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield														
I M F	0	0	—	4	2	**	2	1	**	6	1	8.1														
I M O	48	20	5.1	29	10	7.5	27	10	8.5	104	13	6.7														
I O F	0	0	—	0	0	—	2	1	**	2	*	**														
I O O	8	3	5.3	6	2	9.5	0	0	—	14	2	7.1														
Total	56	23	5.2	39	14	7.8	31	12	9.0	126	16	6.9														
O M F	2	1	**	3	1	**	7	3	13.5	12	2	9.7														
O M O	115	47	4.8	186	66	9.1	170	63	8.1	471	59	7.7														
O O F	1	*	**	0	0	—	4	1	**	5	*	5.2														
O O O	69	29	3.6	54	19	6.1	56	21	6.6	179	23	5.3														
Total	187	77	4.3	243	86	8.5	237	88	7.8	667	84	7.1														

\* Percentage to the total, less than 0.5.

\* \* Average yield has not been given since the observations are few.

## ANNEXURE 20.9—(Contd.)

*Percentage distribution of fields sampled in Sambalpur district for different combinations of practices—Irrigation (I), Manure (M) and Fertilizer (F) and their average yields in quintals per hectare.*

Rice (Winter)										Pooled over all the years.												
Practices followed	1962-63				1963-64				1964-65				No. of fields	% to the total	Av. yield	% to the total	Av. yield	No. of fields	% to the total	Av. yield		
	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield	No. of fields	% to the total	No. of fields	% to the total	Av. yield	No. of fields										
I	2	3	4	5	6	7	8	9	10	11	12	13										
I M F	10	5	7.3	15	5	17.0	13	5	17.8	38	5	14.7										
I M O	98	43	7.8	51	17	12.7	51	19	12.9	200	25	10.4										
I O F	1	*	†	2	1	†	3	1	†	6	1	11.4										
I O O	11	5	7.6	11	4	11.6	18	7	13.3	40	5	11.3										
Total	120	53	7.8	79	27	13.4	85	32	13.7	284	36	11.1										
O M F	6	3	9.7	10	3	15.7	19	7	16.1	35	4	14.9										
O M O	74	32	8.0	168	57	14.0	136	50	12.7	378	48	12.4										
O O F	0	0	—	2	1	†	0	0	—	—	2	*	†									
O O O	28	12	6.7	37	12	12.1	31	11	13.2	96	12	10.9										
Total	108	47	7.8	217	73	13.8	186	68	13.1	511	64	12.8										

\* Percentage to the total, less than 0.5.

† Average yield has not been given since the observations are few.

## CHAPTER XXI

### B U R D W A N (WEST BENGAL)

#### I

21.1 Burdwan district has a geographical area of 7,007 square kilometres, comprises of 2,855 villages, and is delimited into 33 blocks. In 1961 it had a population of 27.59 lakhs of which about 85 per cent was rural. The density of population is about 394 persons per square kilometre. The number of cultivating families is 3.48 lakhs.

21.2 The annual rainfall of about 121.06 cm. is received mostly during the period of the south-west monsoon extending from July to September.

21.3 The eastern, northern, southern and central areas are fully cultivated, but the soil of western portion consists of extreme laterite type which is unfit for cultivation except in the narrow valleys and depressions having rich soil and good moisture. Alluvial type of soil preponderates in almost every part of the district excepting some areas of Asansol Sub-division, situated at the western part of the district where laterite with all sorts of textural types exists.

#### *Land utilisation*

21.4 During the period 1959-60 to 1961-62, the net area sown averaged 4.9 lakh hectares comprising 70 per cent of the total geographical area. About 7 per cent of the net area sown was double cropped making the gross cropped area 5.24 lakh hectares. About 54.0 per cent of the net area sown and 51.6 per cent of the gross cropped area were irrigated during 5 months of monsoon season. Annexure 21.1 gives land utilisation data for the district for the three years ending 1961-62.

#### *Cropping pattern*

21.5 Paddy, the most important crop of the district, covered 86 per cent of the gross cropped area. Among commercial crops, jute, mesta and sugarcane occupied about 5 per cent of the gross cropped area and potato crop occupied about 2 per cent of the gross cropped area.

21.6 During the three years ending 1961-62, the annual output of rice averaged 6.08 lakh tonnes. The production of oilseeds averaged 1.2 thousand tonnes and sugarcane 156 thousand tonnes. Annexure 21.2 shows the area, production and yield per hectare of foodgrains and major commercial crops at the eve of the Package Programme.

### *Land Tenure*

21.7 The land tenure system was originally based on Permanent Settlement of 1793. According to this Settlement the whole of the district belonged to *Burdwan Zamindary*. The *Maharajadhiraj* of Burdwan saved his *zamindary* from dis-memberment to any serious extent by the introduction of the '*patni*' system.

21.8 This '*patni*' or tenure system was extremely simple. With small exceptions the whole area was let out in '*patni*'. Most of the '*patnees*' consisted of single villages or of a small group of villages. A considerable number of them had sublet parts of their lands to '*dar-patnis*' and in a few cases the sub-infeudation extended to a few stages more.

21.9 Under these intermediaries, there were several classes of '*rayats*' namely: a) at fixed rates; b) rent free; and c) occupancy. The *under-rayati* system was in vogue in almost every village but perhaps on account of the prevalence of *bhag* cultivation, they were not very numerous. The cultivation by *bhagdars* is very common throughout the area.

21.10. It will be seen from the above that there were two to five stages of intermediaries between the Government and the actual '*rayats*' or '*under-rayats*'. In order to eliminate these intermediate interests in this district as elsewhere in the State, the Government of West Bengal enacted the West Bengal Estate Acquisition Act, 1963, to provide for the State acquisition of estate or rights of intermediaries therein and of certain rights of '*rayats*' and '*under-rayats*' etc. By this Act, the Government have acquired all the rent receiving interests of all these intermediaries. This Act, *inter-alia* provides that no person will be entitled to retain in his *khas* possession more than 10.1 hectares of agricultural land and 8.1 hectares on non-agricultural lands. The intermediaries have also been allowed to retain lands according to this scale from out of lands held in *khas* possession before this Act,

21.11 The excess lands thus obtained from the intermediaries and the big *rayats* by operation of this Act vested in the State.

21.12 The distribution of these excess lands will be made to the landless cultivators of the areas concerned.

### *Administrative arrangements*

21.13 At the district level, the scheme is under the overall control of the District Magistrate, while the administrative and technical control rests with the Project Executive Officer, who is of the rank of Deputy Director of Agriculture of W.B.H.A.S. Besides, at the district level, three Subject-matter Specialists in Agronomy, Farm Management and Plant Protection in addition to 5 regular W.B.H.A.S. officials including District Agricultural

Officer, District Agronomist-cum-Additional District Agricultural Officer, Officer on special Duty, DVC & Mor Project, Asstt. Jute Development Officer and the Supdt. of Agricultural Marketing have been in position. A Seed Development Officer, who is assisted by 4 Asstt. Seed Development Officers, has been posted to look after the scheme 'Quality Seed Programme'. An Asstt. Registrar of Cooperative Societies has also been posted under the Programme. An Evaluation Officer for conducting crop-cutting experiments and evaluation work connected with IADP is also working at the District Headquarters. Besides these, one Soil Analytical Officer has been appointed under the Soil Testing Scheme and pending completion of the laboratory at Burdwan, he is working in the State Laboratory at Calcutta.

21.14 An Information Unit has been set up with a District Agricultural Information Officer and Asstt. Agricultural Information Officer to create a general awareness among the farmers about the programme itself and to mobilise their active participation in it. This unit, equipped with suitable audio-visual aids, will undertake extensive educational work among the farmers to reinforce field demonstrations by supplementing information through publicity media. Besides these, one post of Subject-matter Specialist for Soils & Fertilizers has been created recently and since been filled up.

21.15 The staff at the block level has been strengthened by providing 2 additional Agricultural Extension Officers, 1 Co-operative Inspector, 2 Cooperative Supervisors (Auditors) and 10 VLWs for each block to attend to the programme at block and village levels respectively.

21.16 Most of the staff sanctioned at the district level was in position as at the end of June 1965, except for 1 post of Block Development Officer, 1 post of Agricultural Extension Officer, 55 posts of VLWs and 3 posts of Cooperative Extension Officers. Annexure 21.3 shows the position in respect of the appointment of additional staff.

21.17 At the State level a Coordination Committee has been set up with the Commissioner for Agriculture and C.D. Department and Ex-Officio Secretary, Agriculture & C.D. Department, as the Chairman. At the district level, one committee has been set up with the District Magistrate as the Chairman.

#### *Coverage*

21.18 The programme was launched in the district during rabi 1962-63 in 158 villages spread over 10 blocks and was extended to 1,552 villages over 24 blocks in 1963-64. During the year 1964-65, the programme covered 1,613 villages in the 24 blocks. The area covered under the programme has registered a rise from 0.006 lakh hectares in 1962-63 to 0.37 lakh hectares in 1963-64 and to 0.86 lakh hectares in 1964-65 representing 0.12 per cent, 7 per cent and 17 per cent respectively of the gross cropped area in

the blocks. The number of farm plans prepared has gone up from 1,500 in 1962-63 to 45,843 in 1963-64 and 78,552 in 1964-65 representing 0.4 per cent, 13 per cent and 23 per cent respectively of the total number of cultivating families in the district.

#### *Fertilizers*

21.19 When the programme was introduced in the district, fertilisers were distributed both by the private companies and the cooperatives. There were hardly any sale depots in the interior rural areas. With the initiation of the programme, the Apex Marketing Society was given monopoly distributorship in the 10 blocks brought under the programme in the first phase. Subsequently, the cooperatives were given monopoly distribution facilities in all the 24 blocks covered during the year 1963-64.

21.20 As a result of streamlining the supply arrangements, there has been an encouraging rise in the offtake of chemical fertilisers as would be evident from following table.

*Distribution of fertilisers in Tonnes*

Year	Nitrogenous fertiliser (in terms of Ammon. sulphate)	Phosphatic fertiliser (in terms of Super phosphate)
1961-62	7,720	2,130
1962-63	10,020	6,660
1963-64	17,280	8,550
1964-65	18,360	10,900

21.21 It will be seen that consumption of nitrogenous fertilisers has gone up from 7,720 tonnes in the base year 1961-62 to 18,360 tonnes in the year 1964-65 or by 238 per cent, while that of phosphatic fertilisers has gone up from 2,130 tonnes in 1961-62 to 10,900 tonnes in 1964-65 or by 512 per cent.

#### *Improved seeds*

21.22 The establishment of one regional seed testing laboratory with requisite staff has been sanctioned for the district. Under the Quality Seed Programme, the production of foundation seeds on Government farms is being restricted to the minimum number of paddy varieties. Arrangements have been made for cleaning and treating all seeds issued from Government farms to registered seed growers. As a measure of incentive, the State Government have previously agreed to give a premium of Rs. 1.50

per maund to growers and Rs. 0.50 per maund to co-operatives. Recently, rate of premium has been changed to Rs. 4/- and Rs. 8/- per quintal for *aman* and *aus* paddy respectively. The quantity of improved seeds distributed has risen from 310 tonnes in 1962-63 to 1,478 tonnes in 1964-65.

#### *Plant protection*

21.23 In order to promote wider adoption of the plant protection measures, the State Government have given a subsidy varying from 50 to 75 per cent of the price of pesticides. The progress of plant protection work would be seen from the table below :—

Year	Area treated against pests & diseases. (Hectares)	Seed treated.	Pesticide for- mulations used.
		(Tonnes)	(Tonnes)
1962-63	5,183	52	,37
1963-64	12,708	347	137
1964-65	49,747	1,277	546

#### *Improved Implements*

21.24 The State Government have issued sanction for the implements workshop. Improved implements such as mould board plough, paddy seeders and wheel hoes are being distributed through block agencies at 50 per cent subsidised rates. Now co-operatives have been permitted to sell implements. The mould board plough has gained wide popularity with the farmers.

#### *Demonstration*

21.25 The programme of laying composite demonstrations, on the cultivators' fields is being intensified. The number of composite demonstrations laid on cultivators' fields has increased from 198 in 1962-63 to 1907 in 1963-64 and 2317 in 1964-65. The results of these demonstrations during 1964-65 have shown a rise in the average yield of *aman* paddy in demonstrations as compared to 'control' plots to the tune of 19 per cent and 27 per cent in case of jute. The results of these demonstrations show a return of Rs. 2.4 to Rs. 3.7 for each additional rupee spent on the recommended improved methods.

#### *Soil Testing*

21.26 The soil samples are tested at the Central Soil Testing Labo-

ratory, Tollygunj, Calcutta. The progress made in soil testing is shown in the following table:

Year	Samples collected	Samples tested	Recommendations made
1962-63	2,000	1,000	1,000
1963-64	1,689	1,379	916
1964-65	3,192	1,841	1,545

#### *Cooperative Credit and Marketing*

21.27 The number of primary credit societies was 1026 in 1961-62, 1260 in 1963-64 and 1300 in 1964-65. The membership of these societies increased from 0.69 lakh in 1961-62 to 0.90 lakh in 1963-64 and to 0.99 lakh in 1964-65. The share capital witnessed a rise from Rs. 20.20 lakhs in 1961-62 to Rs. 34.00 lakhs in 1963-64 and to Rs. 38.46 lakhs in 1964-65. The deposits with the societies increased more sharply from Rs. 2.77 lakhs in 1961-62 to Rs. 8.00 lakhs in 1963-64 and further to Rs. 14.27 lakhs in 1964-65. The loans advanced marked a rise from Rs. 75.03 lakhs in 1961-62 to Rs. 114.76 lakhs in 1963-64 and to Rs. 130.60 lakhs in 1964-65. The percentage of loans advanced in kind to total amount of loans given has increased to 20 in 1963-64. The percentage of overdues has been reduced from 23 in 1961-62 to 18 in 1962-63 but this has increased to 28 in 1964-65.

21.28 In addition to cooperative loans, the Government advanced *taccavi* loans to the agriculturists to the tune of Rs. 8.33 lakhs in 1962-63 and Rs. 14.67 lakhs in 1963-64.

21.29 In order to liberalise the provision of credit, the credit-limit of credit societies has been raised to Rs. 2000 per member. From the year 1963-64 the provision of 20 per cent of the local credit admissible in kind has been made compulsory.

21.30 The membership of 2 Central Banks in the district went up from 1763 in 1961-62 to 1964 in 1964-65. During the same period, their share capital increased from Rs. 12.03 lakhs to Rs. 22.64 lakhs, deposits from Rs. 60.45 lakhs to Rs. 106.91 lakhs and loans advanced from Rs. 90.29 lakhs to Rs. 142.79 lakhs. The percentage of overdues to demand had also been reduced from 25.0 in 1961-62 to 21.0 in 1962-63.

21.31 The number of primary marketing societies was 14 in 1961-62 and this increased to 16 in 1964-65. The membership increased from 5666 in 1961-62 to 9287 in 1964-65 and their share capital went up in the same period from Rs. 2.05 lakhs to Rs. 5.96 lakhs. The value of agricultural

produce marketed by these societies on outright purchase basis was of the order of Rs. 2.44 lakhs during each of the years 1961-62 and 1962-63. During 1964-65, these societies marketed agricultural produce worth Rs. 5.62 lakhs. A phased programme for development of cooperative marketing has been drawn up in the district.

#### *Storage Godowns*

21.32 As against 273 godowns needed to saturate the district, 56 godowns were already existing as in June 1964 while 52 were under construction and 165 remained to be constructed. During the year 1964-65, 47 godowns were added to the number existing last year, bringing the total number of godowns existing as in the June 1965 to 103.

## II

#### *Results of crop-cutting surveys, 1963-65*

21.33 As in other districts, Bench-mark and Assessment Survey is an integral part of IADP in Burdwan district. The programme covers 24 blocks out of 33 blocks of the district. The assessment survey is also limited to this area. The survey commenced in the year 1963-64 and since then it is being repeated annually. Under this survey, 800 cultivators' holdings are annually selected for agronomic and agro-economic enquiry and 300 fields are selected for yield assessment of paddy (winter) crop, which is the principal crop of the district. In addition, about 200 holdings and 75 fields are selected annually for agronomic and crop-cutting surveys respectively in control blocks namely Indus in Bankura district, Pandua in Hooghly district, Bolpur in Birbhum district and Santipur in Nadia district. In this section, the results relating to crop cutting surveys for the years 1963-65 are described.

#### *Yields rates*

21.34 The yield rate during the two years covered by the survey was more or less of the same order in both the years in the IADP district, the control area and other comparable areas as can be seen from the Annexure 21.4. However, the rate of increase in yield in IADP blocks during these two years was higher than that obtained in adjoining areas.

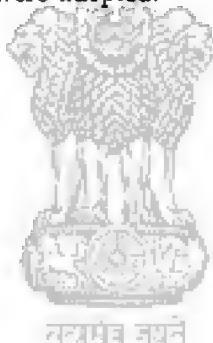
21.35 The proportion of participant cultivators and average yield obtained by them as well as by non-participant cultivators for the two years are given below.

Year	Percentage of participant cultivators	Average yield in quintals per hectare	
		Participants	Non-participants
1963-64	21	18.5	18.3
1964-65	33	17.7	17.3

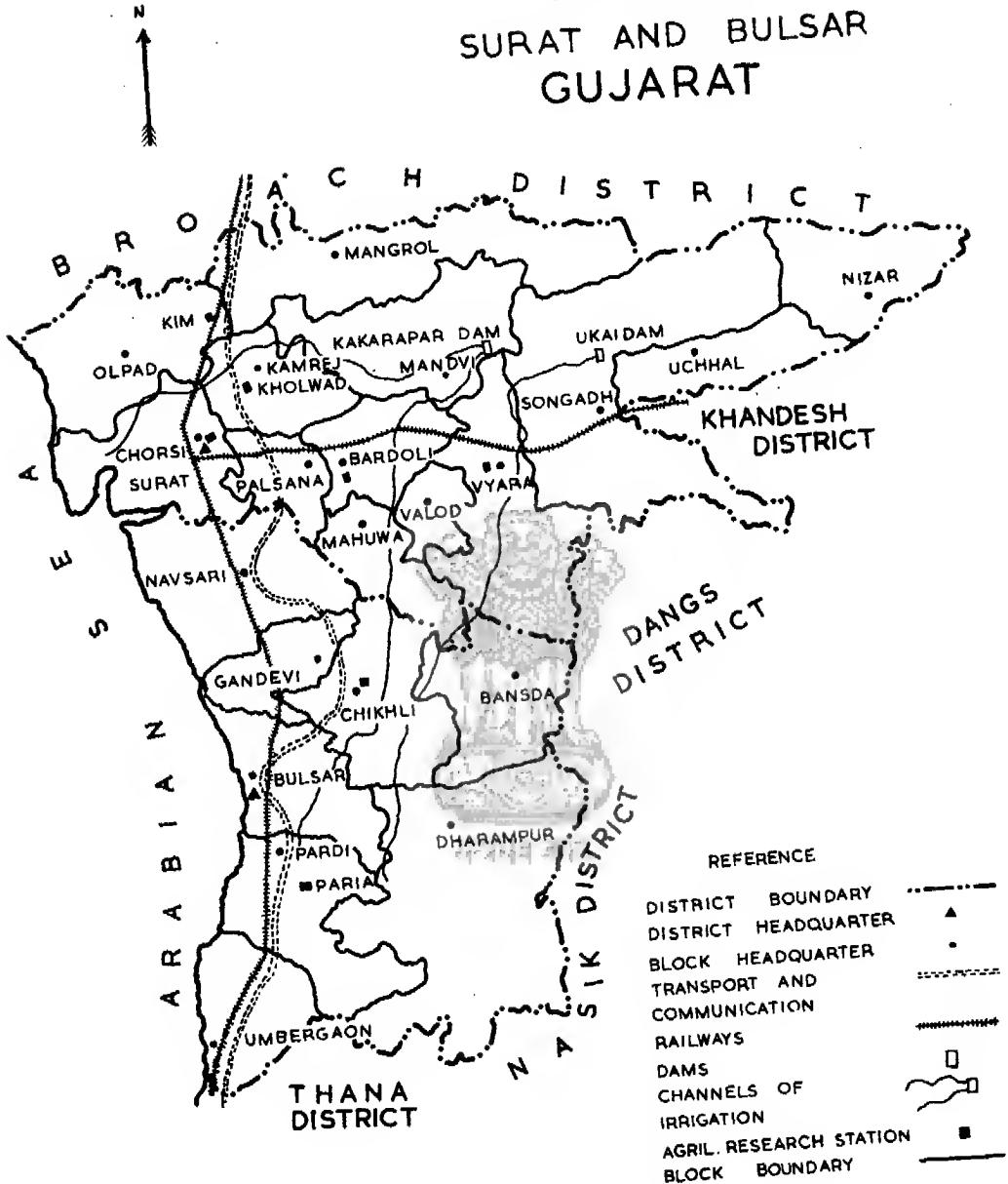
It may be observed that more farmers joined the programme during 1964-65 but there was no improvement in the yield rates obtained by them.

*Yield rates in relation to improved seeds and different combinations of agronomic practices.*

21.36 It may be observed from the Annexure 21.5 that the farmers are more inclined to use the fertilizer in the fields with assured irrigation. About 61 per cent of the irrigated fields received the benefits of the application of the fertilizer while the corresponding percentage for unirrigated ones was about 42. It has been found that the fertilized fields gave higher yields as compared to non-fertilized fields for both categories of area, irrigated and unirrigated. Overall additional yield in the fertilized fields over unfertilized fields was of the order of 2 quintals per hectare. Only 6 per cent of the sampled fields were observed to be sown with improved seeds obtained from co-operatives and other recognised sources. The yields obtained in these fields were, however, higher than those sown with home-grown seeds. A significant feature of the district was that in about 10 per cent of the fields, plant protection measures were adopted.



DISTRICTS  
SURAT AND BULSAR  
GUJARAT



## ANNEXURE 21.1

*Land Utilisation & Irrigation—Burdwan (West Bengal)*

(In lakh Hectares)

Sl. No.	Type of area according to use	1959-60	1960-61	1961-62	Average
1	2	3	4	5	6
1.	Geographical area according to village papers	7.007	7.007	7.007	7.007
2.	Forest	0.182	0.182	0.182	0.182
3.	Barren & uncultivable land	1.380	1.382	1.382	1.381
4.	Land put to no-agricultural uses including home-steads, grave yards, roads, canals, lakes etc.	..	..	..	..
5.	Cultivable waste	0.405	0.358	0.360	0.374
6.	Permanent pasture & other grass lands	..	..	..	..
7.	Land under miscellaneous tree crops and groves not included in the net area sown	..	..	..	..
8.	Current fallows	0.304	0.104	0.109	0.172
9.	Fallow land other than current fallows	..	..	..	..
10.	Net area sown	4.736	4.981	4.974	4.897
11.	Net area sown expressed as percentage of geographical area	67.59	71.09	70.99	69.89
12.	Area sown more than once	0.341	0.356	0.335	0.344
13.	Area sown more than once expressed as percentage of net area sown	7.20	7.15	6.74	7.02
14.	Gross cropped area	5.077	5.337	5.309	5.241
15.	Net irrigated area	2.560	2.595	2.780	2.645
16.	Area irrigated more than once	0.057	0.063	0.052	0.057
17.	Gross irrigated area	2.617	2.658	2.832	2.702
18.	Net irrigated area expressed as per cent of net area sown	54.05	53.10	55.89	54.01
19.	Gross irrigated area expressed as per cent of gross cropped area	51.55	49.80	53.34	51.56

ANNEXURE 21.2  
*Estimates of Area, Production and Yield of major crops—Burdwan (West Bengal)*

Crops	Area (Hectares)					Production (Metric tons)					Yield (Quintals per hectare)						
	1959-60	1960-61	1961-62	Average 1959-62	1959-60	1960-61	1961-62	Average 1959-62	1959-60	1960-61	1961-62	Average 1959-62	1959-60	1960-61	1961-62	Average 1959-62	
1	2	3	4	5	6	7	8	9	10	11	12	13	1	2	3	4	
Rice	434748	462104	449302	448835	512369	699821	611734	607955	11.79	15.14	13.60	13.54					
Jowar																	
Bajra																	
Maize																	
Ragi																	
Small millets																	
Wheat	2428	2509	2388	2442	1626	1930	1829	1795	6.70	7.69	7.66	7.35					
Barley	1295	607	480	794	508	305	305	373	3.92	5.02	6.35	4.70					
Total cereals	438633	465341	452832	452269	514605	702158	613970	610245	11.73	15.09	13.56	13.49					
Gram	10967	7891	7770	8876	5182	4775	4267	4741	4.73	6.05	5.49	5.34					
Tur	7972	13719	11129	10940	3864	8338	7219	6474	4.85	6.08	6.49	5.92					
Sesamum	202	202	202	202	102	102	102	102	5.05	5.05	5.05	5.05					
Rape & mustard	3480	2226	4209	3305	813	813	1219	948	2.34	3.65	2.90	2.87					
Linseed	607	607	405	540	102	102	102	102	1.70	1.70	2.52	1.89					
Total oil-seeds	4289	3035	4816	4047	1017	1017	1423	1152	2.37	3.35	2.95	2.85					
Sugar-cane	3318	3683	3561	3521	135636	184810	148438	156295	408.79	501.79	416.84	443.89					
Potato	11007	11291	9631	10643	178613	144374	137770	153386	162.27	127.87	143.05	144.31					

## ANNEXURE 21.3

*Additional staff sanctioned and in position for IADP, Burdwan*

S. No.	Category	Additional staff sanctioned as on 30th June				Total staff in position as on 30th June		
		Per Block	1963	1964	1965	1963	1964	1965
1	2	3	4	5	6	7	8	9
<b>A. Block Level :</b>								
1.	Agricultural Extension Officer	2	46	48	48	24	38	47
2.	Village Level Worker	10	230	240	240	95	190	217
3.	Cooperative Inspector	1	23	24	24	5	21	24
<b>B. District Level :</b>								
1.	Project Officer	—	1	1	1	1	1	1
2.	Subject-matter Specialist	—	2	2	3	2	2	3
3.	Assistant Registrar	—	1	1	1	1	—	1
<b>C. Agricultural Information :</b>								
1.	Agricultural Information Officer	—	1	1	1	—	1	1
2.	Asstt. Agricultural Information Officer	—	1	1	1	—	1	1
3.	Photographer	—	1	1	1	—	1	1
4.	Artist	—	1	1	1	—	1	1
5.	Press Operator	—	—	1	1	—	—	1
6.	Asstt. Press Operator	—	—	1	1	—	—	—
<b>D. Agricultural Engineering :</b>								
1.	Agricultural Engineer	Staff not sanctioned				—	—	—
2.	Asstt. Agricultural Engineer	—	-do-	-do-	1	—	—	—
3.	Workshop Mechanic	—	-do-	-do-	3	—	—	—
4.	Artisan	—	-do-	-do-	—	—	—	—
<b>E. Soil Testing Laboratory :</b>								
1.	Soil Analytical Officer	—	-do-	-do-	1	—	—	1
2.	Research Assistant	—	-do-	-do-	2	—	—	—
3.	Scientific Assistant	—	-do-	-do-	4	—	—	4

ANNEXURE 21.3 (*Continued*)

1	2	3	4	5	6	7	8	9
<b>F. Quality Seed Programme :</b>								
1.	Seed Development Officer	—	-do-	1	1	—	—	1
2.	Asst. Seed Development Officer	—	-do-	4	4	—	4	4
<b>G. Benchmark Survey :</b>								
1.	Evaluation Officer	—	-do-	1	1	—	1	1
2.	Statistical Asstt.	—	—	1	—	—	—	—
3.	Field Inspector	—	—	2	2	—	2	2
4.	Investigator	—	—	9	9	—	9	9
5.	Computer	—	—	2	2	—	2	2



## ANNEXURE 21.4

*Average yields in quintals per hectare and production of Rice (Winter) in Burdwan district, West Bengal State and comparable areas.*

Year	IADP district		Average yield in comparable areas (Q/H)		Production in Burdwan ('00 tonnes)	Value of production (Rs. in lakhs)**	
	Average yield	Standard error	Control area	Adjoining* districts			
1	2	3	4	5	6	7	8
<b>Average for 3 years</b>							
1960-63@	14.3	N.A.	N.A.	11.9	11.2	6107	3405
1963-64†	18.3	0.30	15.7	13.0	11.8	6456	3600
1964-65†	17.6	0.22	15.7	13.8	12.3	6298	3461

\*Nadia, Bankura, Hoogly, Birbhum and Murshidabad.

\*\*Value of production is worked out on the basis of the State harvest price for the year 1960-61.

† The average yield relates to the 24 blocks covered under IADP. This is based on IADP series only.

@Relates to the whole of the district.

## ANNEXURE 21.5

*Percentage distribution of fields under Rice (Winter) sampled in Burdwan district for different combinations of practices—Irrigation (I), Manure (M) and Fertilizer (F) and their average yields in quintals per hectare.*

Practices followed	1963-64			1964-65			Pooled over the two years					
	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Av. yield	No. of fields	% to the total	Average yield	No. of fields	% to the total	Average yield
I	2	3	4	5	6	7	8	9	10			
I M F	93	33	26.2	119	32	18.6	212	32	19.3			
I M O	54	19	18.6	58	16	17.2	112	17	17.9			
I O F	5	2	15.5	5	1	19.3	10	2	17.4			
I O O	10	4	17.6	17	4	17.0	27	4	17.2			
Total	162	58	19.4	199	53	18.1	361	55	18.7			
O M F	52	18	18.3	60	16	17.7	112	17	18.0			
O M O	47	17	15.5	76	21	15.6	123	19	15.6			
O O F	3	1	*	8	2	15.1	11	2	15.1			
O O O	16	6	16.4	29	8	15.1	45	7	15.6			
Total	118	42	16.8	173	47	16.2	291	45	16.4			

\* Average yield has not been given for observations less than 5.

## CHAPTER XXII

### BHANDARA (MAHARASHTRA)

#### I

22.1 Bhandara district lies in the extreme eastern end of Maharashtra State, touching the borders of Madhya Pradesh. The district comprises of 3 taluks and 1478 villages covering a total area of 9239 square kilometres and has been delimited into 13 community development blocks. The population in the year 1961 was 12.48 lakhs with a density of 135 persons per square kilometre. About 91 per cent of the population was classified as rural. There are 2.65 lakh cultivating families in the district.

22.2 The average rainfall is about 141 cm. and is received mostly during the period July to August and is well spread upto September. The soils are light in general except in two blocks where they are heavy and clayey and clayey loam.

#### *Land Utilisation*

22.3 During the three years preceding the introduction of the package programme, the net area sown averaged about 3.8 lakh hectares, comprising 41 per cent of the total geographical area of the district. About 36 per cent of the total net area sown was double cropped making the gross cropped area 5.17 lakh hectares. About 32 per cent of the net area sown and 24 per cent of the gross cropped area are irrigated and are mostly under paddy crop. The most important source of irrigation constitutes tanks, followed by channels taken from small 'nals' and wells. Annexure 22.1 gives land utilisation data for the years 1959-60 to 1961-62.

#### *Cropping pattern*

22.4 The district is a mono-crop paddy area. Paddy covered 50 per cent of the gross cropped area and foodgrains as a whole covered 68 per cent. The other food crops are wheat, gram and rabi-jowar. Among commercial crops, oilseeds occupied 10 per cent of the gross cropped area.

22.5 During the three years preceding the introduction of the programme, the output of cereals in the district averaged 2.87 lakh tonnes annually which included 2.55 lakh tonnes of rice, 0.14 lakh tonnes of wheat and 0.16 lakh tonnes of jowar. The output of oilseeds stood at 0.11 lakh tonnes and sugarcane at 0.02 lakh tonnes. Annexure 22.2 shows the area, production and yield per hectare of foodgrains and commercial crops prior to the introduction of the IADP.

### *Land Tenure*

22.6 Abolition of *non-ryotwari* tenures and their conversion into *ryotwari* tenures has almost been completed with the exception of certain *inams*. A landlord is permitted to resume land for personal cultivation, the level of assumption being 3 family holdings and the size of a family holding varies from 2.28 hectares to 96.16 hectares. A small owner, who holds land not exceeding a family holding and who earns his livelihood principally from agriculture, is entitled to resume upto 31st March, 1963, the date from which the tenants of non-resumable area would be deemed to be owners thereof.

22.7 A provision has been made in the Bombay Tenancy and Agricultural Lands (Vidarbha Region) Act, 1958 to review surrenders made on or after 1st January 1963 and for restoration of land to the tenant if it was found that the surrender was obtained by fraud. The rent is not to exceed 1/6th of the gross produce or 2 to 5 times the land revenue, whichever is less.

22.8 The tenants have an optional right of purchase upto 3 family holdings subject to the condition that landlord is left with one family holding. This condition is not applicable to occupancy tenants. A provision has been made for compulsory transfer of ownership to tenants with effect from the 1st April, 1961, subject to the condition that the landlord is left with the family holding. The Act has been amended in 1962 to transfer the balance of land to the tenants with effect from 1st April, 1963. The ceiling on holdings varies from 7.3 to 51.0 hectares according to the different types of lands. Allowance is made for size of family subject to an upper limit of thrice the ceiling-area. Ceilings on future acquisition have been fixed at 2/3rds of the ceiling on existing holdings.

### *Administrative arrangements*

22.9 The overall charge of the programme is held by the Director of Agriculture. He is assisted by the Chief Officer, Package Programme and one Deputy Chief Project Officer. On the cooperative side, there is one Assistant Registrar and a Cooperative Officer. The other personnel at the district level comprise of four Subject-matter Specialists, one Additional District Agricultural Officer, one Agricultural Information Officer, one Agricultural Engineer, one Assistant Soil Chemist and one Seed Development Officer. In each block there are 4 Additional Agricultural Extension Officers, 10 Village Level Workers, 1 Cooperative Extension Officer and 3 Cooperative Inspectors. The total staff at the district level comprise of 13 Block Development Officers, 65 Agricultural Extension Officers, 290 VLWs, 26 Cooperative Extension Officers, and 39 Cooperative Inspectors. Except for three Agricultural Extension Officers, all the other staff were in position in June 1965. Annexure 22.3 shows the position in respect of the additional staff.

22.10 Coordination Committees, both at the State and district level, have been set up and are functioning. The State Minister for Agriculture is the Chairman of the State Level Coordination Committee. The Secretary, Agriculture and Cooperative Department, is the Chairman of the State Level Standing Committee. The district level Coordination Committee is headed by the President of *Zila Parishad*, Bhandara.

#### *Coverage*

22.11 The Package Programme was launched in October, 1962 but the actual implementation started from the kharif season of 1963-64. During the year 1963-64, the programme covered 1241 villages spread over all the 13 blocks. The programme extended to 1474 villages during 1964-65. The cultivated area covered under the programme was 0.17 lakh hectares in the year 1963-64, and it went up to 0.44 lakh hectares during 1964-65, representing 3 per cent and 9 per cent respectively of the gross cropped area in the selected blocks. The number of farm plans prepared during 1963-64 was only 17,000 and this increased to 25,742 in the year 1964-65, representing about 10 per cent of the total number of cultivating families in the district.

#### *Fertilizers*

22.12 The offtake of nitrogenous and phosphatic fertilizers is shown in the table below :—

(Tonnes)

Year	Nitrogenous (in terms of ammon. sulphate)	Phosphatic (in terms of super phosphate)
1962-63 (pre-package)	1847	592
1963-64	2983	1963
1964-65	3122	1840

22.13 It will be seen that the offtake of nitrogenous fertilizers went up by 69 per cent during the period 1962-63 to 1964-65 while that of phosphatic fertilizers increased by 211 per cent. The slight shortfall in the offtake of phosphatic fertilizers during 1964-65, as compared to the preceding year, was due to late precipitation that year. There are 203 distributing centres for both nitrogenous and phosphatic fertilizers.

#### *Improved seeds*

22.14 Most of the cultivators had their own improved seeds, thanks to the existence of a scheme of multiplication and distribution of improved

seeds for the past many years. In order to improve the quality of seeds used by cultivators which had come to deteriorate, foundation seed was supplied to registered seed growers from the Taluka Seed Farms of the district and Government Seed Farm, Chanda District. During 1962-63, 107 tonnes of improved seeds were distributed. During the year 1963-64 and 1964-65 the quantity of improved seeds distributed was 166 tonnes and 286 tonnes respectively.

#### *Plant protection*

22.15 In this district, paddy crop does not normally suffer from any serious insect attack, though the attack of case-worm, in a sporadic manner, is almost a yearly occurrence. In the first year of the programme, the cultivator hardly used any plant protection measure though most of the acreage brought under the package of practices was dusted and sprayed departmentally. The progress of plant protection work is indicated in the following table:

Year	Area treated against pests and diseases (hectares)	Seeds treated (tonnes)	Pesticide formula- tions used (tonnes)
1962-63	900	21	—
1963-64	6,500	70	17.0
1964-65	17,000	390	35.1

#### *Improved Implements*

22.16 Introduction and popularisation of improved agricultural implements is sought to be done through establishment of an implements workshop. Pending the construction of workshop building at a site selected for the purpose, the workshop has been housed in a hired building. This workshop is engaged in testing the local implements, with a view to planning improvements and designing new implements. During the year 1963-64, 168 *gurmas* (inter-cultivating implements), 10 iron ploughs, 2 paddy puddlers, 20 sprayers and 12 dusters were supplied to cultivators.

#### *Demonstrations*

22.17 In order to convince the cultivators about the economic utility of adopting improved scientific agricultural practices recommended under the Package Programme, composite demonstrations are laid on cultivators' fields. Compared to 975 composite demonstrations laid on cultivators' fields during 1963-64, the number of such demonstrations laid during 1964-65 was only 925 owing to greater attention being devoted to their quality

and follow-up. The results of demonstrations laid during 1964-65 showed an increase of 49 per cent in the average yield of paddy, 68 per cent in the case of wheat and 79 per cent in the case of jowar, in treated plots as compared to control plots. An analysis of the data relating to these demonstrations indicated that there was a return of Rs. 2 to Rs. 3 for each additional rupee invested on the recommended practices.

#### *Soil Testing*

22.18 Soil analysis forms the basis for recommending the choice of crops, types of fertilizers and their application in scientific doses. The existing soil testing laboratory at Nagpur has been strengthened to enable it to handle the soil tests in respect of the package district of Bhandara. The progress made in soil testing is shown below :

Year	Samples collected	Samples tested	Recommendations made
1963-64	6,463	8,295	8,295
1964-65	8,189	4,047	4,047

#### *Minor Irrigation*

22.19 The construction of 8 new tanks with an irrigation potential of 1420 hectares in Bhandara district had been sanctioned in the First Five Year Plan. Of these only 5 tanks were constructed during the course of the First and Second Plans. Construction of the remaining 3 tanks, as also the work relating to renovation and repairs of *ex-malguzari* tanks in the district were included in the minor irrigation programme for the district in the Third Plan. There existed about 3,187 *ex-malguzari* tanks in the district irrigating about 38,415 hectares. Their capacity varied from about 40 to 400 hectares. These tanks were pretty old and many of them required repairs as well as renovation. This work had been taken up both by the State sector as well as by *Zilla Parishad*. The former looked after the repair of tanks irrigating more than 100 hectares and the latter of those irrigating 100 hectares or less. The State sector had so far taken up repairs/renovation of 40 tanks and had plans to undertake further work of repair and renovation of 50 tanks. The *Zilla Parishad* had also taken up 335 works which were in progress. So far, all the minor irrigation programmes had been looked after by the Minor Irrigation Division, Bhandara. But with a view to accelerating the same, one more Division, viz, *Ex-Malguzari Tanks Division*, Gondia was opened recently.

*Cooperative credit & Marketing*

22.20 The number of primary credit societies has remained unchanged at 794 during 1962-63 to 1964-65 but the membership has increased from 0.76 lakh in 1962-63 to 0.83 lakh in 1963-64 and to 0.86 lakh in 1964-65. The share capital of these societies has gone up from Rs. 45.43 lakhs in 1962-63 to Rs. 48.16 lakhs in 1963-64 and to Rs. 52.26 lakhs in the following year. The amount of loans advanced, mainly short-term, which stood at Rs. 91.72 lakhs in 1962-63 came down to Rs. 76.64 lakhs in 1963-64 and then expanded to Rs. 84.15 lakhs. During 1963-64 the co-operatives covered all the villages in the district; the percentage of agricultural population covered by cooperatives has increased from 44 in 1962-63 to 47 in 1963-64 and to 49 in 1964-65.

22.21 The maximum credit limit for each member, fixed at Rs. 1500 for short-term loans and Rs. 1000 for medium-term loans, prior to the introduction of the programme, continues to exist without any constraint on the additional credit required under the Package Programme.

22.22 The membership of District Cooperative Central Bank Ltd. of the district went up from 1349 in 1961-62 to 1362 in 1962-63, but came down to 1005 during 1963-64 and to 995 in 1964-65. The share capital rose from Rs. 43.85 lakhs in 1961-62 to Rs. 57.65 in 1963-64 and then dropped to Rs. 47.16 lakhs. The working capital of the Bank showed a marginal decline from Rs. 178.06 lakhs to Rs. 174.86 lakhs between 1961-62 and 1963-64, but increased to Rs. 189.86 in the subsequent years. The amount of loans advanced declined from Rs. 114.71 lakhs in 1961-62 to Rs. 76.58 lakhs in 1963-64 and then increased to Rs. 118.83 lakhs in 1964-65.

22.23 The number of primary marketing societies in the district remained at 14 during each of the years 1962-63 to 1964-65. The membership of these societies stood at 3455 in 1962-63, 3606 in 1963-64 and 3668 during the year 1964-65. The share capital marked a rise from Rs. 2.89 lakhs in 1962-63 to Rs. 8.73 lakhs in 1964-65. A phased programme had been drawn up for linking credit with marketing, whereunder all the co-operative rice mills would be undertaking the marketing of agricultural produce of the cultivators participating in the programme. The value of agricultural produce handled by these societies was of the order of Rs. 12.33 lakhs and Rs. 15.84 lakhs in 1962-63 and 1963-64 respectively. However, during 1964-65, the value of agricultural produce marketed by these societies aggregated to only Rs. 10.83 lakhs.

*Storage Godowns*

22.24 As against 558 godowns needed to saturate the district, 127 godowns already existed as in June, 1964 while 142 were under construction and 291 remained to be constructed. During the year 1964-65, 11

godowns were added to the number existing last year making the total number of godowns constructed to 138.

## II

*Results of Agronomic and Agro-economic Survey, 1962-63*

22.25 Agronomic and agro-economic survey was initiated in the year 1962-63 (one year prior to the actual commencement of the IAD Programme) in the district and 5 control blocks, namely, Ramtek and Kuhi in Nagpur district and Brahmputri, Nagbhir and Chimur in Chanda district; since then it is being repeated annually. In the year 1962-63, 768 holdings in the district and 384 holdings in the control blocks, at the rate of 8 cultivators per village, were randomly selected for enquiry.

*Holding size*

22.26 The cultivators were classified in four groups according to the size of their holdings. The proportion of cultivators falling in the four groups, the area cultivated by them and the average size of the holdings are given in the table below :

	Very small (upto 1 hectare)	Small (1-2 hectares)	Medium (2-4 hectares)	Large (above 4 hectares)
Percentage of the cultivators in the group to the total	25	26	25	24
Average size in hectares	0.58	1.46	2.98	7.84
Percentage of cultivated area for the groups to the total	8	15	27	50

Cultivators were evenly distributed among the four size groups. In terms of area, about 50 per cent was cultivated by cultivators of large size holdings, whereas very small and small holdings together accounted for only 23 per cent of the cultivated area. The average size of holding in the district was estimated at 3.1 hectares.

*Cropping pattern*

22.27 Annexure 22.4 gives the cropping pattern followed by cultivators in different holdings size groups. Area under foodgrains accounted for over 86 per cent of the gross cropped area in all holdings size groups. Linseed was the main non-food crop grown in the district. Paddy was the

chief crop grown in holdings of all size groups. Wheat and jowar were the other important cereal crops grown in the district. The percentage area under paddy crop decreased with increase in holding size. On the other hand, there was a positive association between holding size and the percentage area under wheat and jowar crops.

#### *Facilities for supplies, storage and marketing*

22.28 Nitrogenous and phosphatic fertilizers were the chief items of production supplies received by the cultivators. Supplies of nitrogenous and phosphatic fertilizers were availed of by 13 per cent and 5 per cent of the cultivators. It was observed that the cultivators of large size holdings took relatively more advantage in availing of supplies of both these fertilizers. The quantity per hectare of cultivated area taken by recipient cultivators, however, decreased with increase in holding size.

22.29 Improved seed of paddy was availed of by a small percentage of cultivators (less than 5 per cent). The cultivators having large size holdings were availing of the supply of paddy seed in larger quantities.

22.30 Facilities for the supply of chemical fertilizers within the village or in its neighbourhood were available in about 85 per cent of the villages in the district. Cooperative societies and the Government were the main agencies for distribution of chemical fertilizers.

22.31 Facility for storage of farm produce was generally not available in the villages. About 90 per cent of the villages had marketing facilities within reasonable distance for disposing of their foodgrain-surplus. Marketing was done mainly through private agencies.

#### *Use of fertilizers and manures*

22.32 The total quantities of nitrogenous and phosphatic fertilizers distributed in 1962-63 were of the order of 1850 tonnes and 600 tonnes respectively. Almost the entire quantity of these fertilizers were applied to paddy crop. The total quantity of farmyard manure produced in the district was estimated at 6.7 lakh tonnes. This manure was also applied almost wholly to paddy crop.

22.33 Fertilizers and manures were used by cultivators in the district mainly during kharif season. The entire quantity of fertilizers was applied in conjunction with F.Y.M. or compost. It was observed that cultivators of large size holdings were fertilizer-minded to a greater extent than those of smaller holding sizes.

#### *Percentage area benefited by manures and fertilizers and their rates of application*

22.34 Fertilizers and manures were mainly applied to paddy crop. For this crop, 10 per cent of the area was benefited by nitrogenous fertilizers and 5 per cent by phosphatic fertilizer. (Annexure 22.5)

22.35 It was observed that the cultivators of medium and large size holdings were applying chemical fertilizers generally to larger proportion of area under paddy than those of the other holdings.

22.36 The average rates of application per hectare of nitrogenous and phosphatic fertilizers to paddy crop were of the order of 58 kg. and 52 kg. respectively. The recommended rates of nitrogenous and phosphatic fertilizers to this crop per hectare were 164 kg. and 125 kg. respectively (combined for irrigated and unirrigated crops of paddy). It would be seen that there is a wide gap between the rates of application adopted by cultivators and the recommended rates.

### III

#### *Results of crop-cutting surveys conducted during 1962-65*

22.37 Crop-cutting survey was initiated in the district and five control blocks in 1962-63 and since then it is being repeated annually. The crops covered under crop-cutting survey were paddy, wheat and rabi-jowar which accounted for about 71 per cent of the gross cropped area in the district. The estimates of average yield of these crops are presented in Annexure 22.6. The yield rates of all the crops covered under the programme during the period 1963-65 except rice were not higher than those for the period 1960-63.

#### *Participants Vs. Non-participants*

22.38 The package programme was launched during kharif season 1963-64 and the results pertaining to the yields for participant and non-participant cultivators are presented from that year onwards (Annexure 22.7). Coverage under the programme has not made much headway. For paddy crop, the proportion of fields of the participant cultivators was less than 10 per cent in 1964-65. The fields of participant cultivators gave higher yields of rice as compared to those of non-participant cultivators. The benefit of the programme was not being availed of for wheat and rabi-jowar crops.

#### *Agronomic practices*

22.39 Yield rates of fields treated with different combinations of agronomic practices, namely irrigation, manuring and fertilizer application is presented in Annexure 22.8. It was observed that 46 per cent of the fields under paddy received irrigation while wheat and jowar fields were mostly unirrigated. A comparison of the yield rates in irrigated and unirrigated fields indicated that, on an average, irrigated fields of paddy gave an additional yield of 3.2 quintals per hectare than those which were unirrigated. Fertilizers were mainly applied to paddy crop. About 13 per

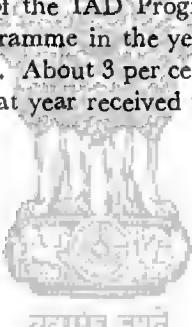
cent of the fields received application of fertilizers in 1964-65. On the average, fields where fertilizers were applied gave additional yield of 3.4 quintals of rice per hectare than those not receiving this input. As these results are based on survey data, increases in the yield rates observed may not be wholly ascribed to single factors like irrigation or fertilizers.

22.40 Paddy and Jowar were almost sown with local varieties. For wheat crop, about 15 per cent of the fields in all the years were sown with improved strain of Hg-65. The performance of the improved strain of wheat was not superior to that of local varieties.

22.41 The programme of distribution of improved seeds through Government-sponsored agencies has not made progress in the district. Even during 1964-65, the proportion of fields sown with improved seed obtained from Government-sponsored agencies was less than 5 per cent (Annexure 22.9).

#### *Plant protection measures*

22.42 Use of plant protection chemicals was practically absent before the commencement of the IAD Programme in the district. With the introduction of the programme in the year 1963-64, a small beginning has been made in this respect. About 3 per cent of the paddy fields sampled for crop-cutting survey in that year received the benefit of plant protection measures.



DISTRICT  
SAMBALPUR

2

SADAR-1(1),MANESWER(2),JUJUMURA (3),RENGALI (4),LAIKERA-1 (5),LAIKERA-2 (6),LAIKERA-3(7),JHARSUGUDA(B),  
LAKKHANPUR(9),GOVINDPUR (10),KUCHINDA(11),JAMINKIRA (12),DEOGARH(13),BARKOTE (14),NAIKUL (15),  
NAKTIODEOL (6),RAIRAKHOL (7),ATTABIRA (16),BARGARH (19),BARPALI (20),BHEDEN(21)JIJEPUR(22),  
SOHLELA (23),BHATILI (24),AMBAAHHONA (25),PADMAPUR (26),GAISILLET(27),PAIKMAL (28),JHARBA (29).

## ANNEXURE 22.1

*Land Utilisation and Irrigation—Bhandara (Maharashtra)*

(00 Hectares)

S. No.	Type of area according to use	1959-60	1960-61	1961-62	Average
1	2	3	4	5	6
1.	Geographical area according to village papers	9239	9239	9239	9239
2.	Forest	2580	2560	2546	2562
3.	Barren & uncultivable land	164	158	154	159
4.	Land put to non-agricultural uses including home steeds, grave yards, roads, canals, lakes etc.	749	753	759	754
5.	Cultivable waste	285	273	262	273
6.	Permanent pasture and other grass lands	1362	1379	1404	1382
7.	Land under miscellaneous tree crops and groves not included in the net area sown	81	80	67	76
8.	Current fallows	81	69	79	76
9.	Fallow land other than current fallows	157	155	138	150
10.	Net area sown	3780	3812	3830	3807
11.	Net area sown expressed as per cent of the total geographical area	40.9	41.3	41.5	41.2
12.	Area sown more than once	1330	1348	1411	1363
13.	Area sown more than once expressed as per cent of net area sown	35.2	35.4	36.8	35.8
14.	Gross cropped area	5110	5160	5241	5170
15.	Net irrigated area	1226	1246	1227	1233
16.	Area irrigated more than once	4	9	8	7
17.	Gross irrigated area	1230	1255	1235	1240
18.	Net irrigated area expressed as per cent of net area sown	32.4	32.7	32.0	32.4
19.	Gross irrigated area expressed as per cent of gross cropped area	24.1	24.3	23.6	24.0

ANNEXURE 22.2  
*Estimates of Area, Production and Yield of major crops—Bhandara (Maharashtra)*

Crops	Area (Hectares)					Production (Metric tons)					Yield (Quintals per hectare)		
	1959-60	1960-61	1961-62	Average 1959-62	1959-60	1960-61	1961-62	Average 1959-62	1959-60	1960-61	1961-62	Average 1959-62	
1	2	3	4	5	6	7	8	9	10	11	12	13	
1. Rice	255879	260331	263163	259791	237134	253492	275133	255253	9.27	9.74	10.45	9.8	
2. Jowar	40832	36664	35733	37743	20422	16866	1176	16155	5.00	4.60	3.13	4.3	
3. Bajra	*	81	*	27	*	*	*	*	*	*	*	*	
4. Maize	809	890	850	850	305	305	305	305	3.77	3.43	3.59	3.6	
5. Ragi	162	162	162	162	*	*	102	102	68	—	6.30	6.30	
6. Small millets	5261	5423	5139	5274	1321	1422	1422	1388	2.51	2.62	2.77	2.6	
7. Wheat	29987	31688	31363	31013	14732	13005	13411	13716	4.91	4.10	4.28	4.4	
8. Barley	81	81	81	81	102	102	102	102	68	12.59	—	8.4	
9. Total cereals	333011	335320	336491	334941	274016	365294	301549	286953	8.33	8.51	8.96	8.6	
10. Gram	10967	10724	10360	10584	3962	3353	3962	3759	3.61	3.13	3.82	3.5	
11. Tur	6030	5787	5868	5895	3048	5283	3353	3885	5.05	9.13	5.71	6.6	
12. Groundnut	567	526	445	513	305	406	203	305	5.38	7.72	4.56	5.9	
13. Castor	81	81	81	81	*	*	*	*	*	—	—	—	
14. Sesamum	567	526	486	526	203	102	102	136	3.58	1.94	2.10	2.6	
15. Rape & mustard	*	40	*	13	*	*	*	*	*	*	*	*	
16. Linseed	52851	48885	52851	51529	8941	8230	13100	10090	1.69	1.68	2.48	2.0	
17. Total oilseeds	54066	50058	53863	52662	9449	8738	13405	10531	1.75	1.75	2.49	1.9	
18. Sugarcane (Gur)	728	931	688	782	2032	2845	2134	2337	27.91	30.56	31.02	29.9	
19. Cotton	4	—	—	1.3	0.13	—	—	0.06	0.45	—	—	0.5	

\* Negligible.

## ANNEXURE 22.3

*Additional staff sanctioned and in position for IADP, Bhandara (Maharashtra)*

S. No.		Additional staff sanctioned as on 30th June			Additional staff in position as on 30th June			
		Per block	1963	1964	1965	1963	1964	1965
1	2	3	4	5	6	7	8	9
<b>A. Block Level :</b>								
1.	Agricultural Extension Officer	4	52	52	52	51	46	50
2.	Village Level Worker	10	190	130	130	130	130	130
3.	Cooperative Extension Officer	1	13	13	13	13	13	13
4.	Central-Bank Society Inspector	3	39	39	39	39	39	39
<b>B. District Level :</b>								
1.	Chief Officer	—	1	1	1	1	1	1
2.	Subject-matter Specialist	—	3	4	4	2	4	4
3.	Asstt. Distt. Agricultural Officer	—	—	—	1	1	—	1
4.	Assistant Registrar	—	1	1	1	1	1	1
5.	Cooperative Officer	—	1	1	1	1	1	1
<b>C. Agricultural Information Unit :</b>								
1.	Agricultural Information Officer	—	1	1	1	—	1	1
2.	Asstt. Agricultural Information Officer	—	1	1	1	1	1	1
3.	Photographer	—	1	1	1	1	1	1
4.	Artist	—	1	1	1	1	1	1
<b>D. Agricultural Implements Workshop :</b>								
1.	Agricultural Engineer	—	1	1	1	1	1	1
2.	Asstt. Agricultural Engineer	—	1	1	1	1	1	1
3.	Workshop Mechanic	—	1	1	1	—	1	1
<b>E. Benchmark Survey :</b>								
1.	Asstt. Statistician	—	1	1	1	1	1	1
2.	Statistical Assistant	—	2	2	2	2	2	2
3.	Field Inspector	—	1	1	1	—	1	1
4.	Supervisor-cum-Relieving Field Inspector	—	1	1	1	1	1	1
5.	Field Investigator	—	9	9	9	9	9	9
6.	Computor	—	2	2	2	2	2	2

## ANNEXURE 22.4

*Percentage area under different crops for different holding size groups in Bhandara district during 1962-63*

Name of crop	Very small holding	Small holding	Medium holding	Large holding	Pooled
	Percent-age to total				
1	2	3	4	5	6
Paddy	63	63	58	58	59
Jowar	2	4	6	7	6
Wheat	4	4	6	7	6
Other cereals & millets	—	1	*	1	1
Pulses	20	16	16	17	17
Chillies	*	*	*	1	1
Oil seeds	7	6	8	6	6
Other crops	4	5	5	2	4

\* indicates percentage less than 0.5



सत्यमेव जयते

## ANNEXURE 22.5

*Percentage area under the Paddy crop in Bhandara district benefited by different manures and fertilizers and their average rates of application.*

Type of area	Kind of organic manure or chemical fertilizer	Percentage area benefited by different manures and fertilizers in holdings of different sizes			Average rate of application of manure or fertilizer for the area benefited in quintals per hectare		
		Very small	Small	Medium			
IADP	1. F.Y.M. or compost	76	81	80	82	80	50
	2. Nitrogenous fertilizer (Ammonium sulphate or equivalent)	2	6	13	12	10	0.58
	3. Phosphatic fertilizer (Super phosphate or equivalent)	2	6	9	6	5	0.52
Control	1. F.Y.M. or compost	55	64	70	61	62	48
	2. Nitrogenous fertilizer (Ammonium sulphate or equivalent)	—	9	—	.6	5	*
	3. Phosphatic fertilizer (Super phosphate or equivalent)	—	—	—	—	—	—

\* Average rate for chemical fertilizer not given as the number of observations were less than 5.  
 Note : The average rates of application of the chemical fertilizers have not been presented separately for each holding size since the observations for many of the holding sizes were few.

**ANNEXURE 22.6**  
*Average yield in quintals per hectare in Bhandara district and in comparable areas*

Crop	Year	Bhandara district			Control area			Maharashtra State excluding Bhandara district		Production in '00' tonnes in Bhandara district Average yield			
		Average yield	Standard error	Average yield	Standard error	Adjoining districts*							
						Average yield	Average yield						
1	2	3	4	5	6	7	8	9	9	9			
<b>Rice</b>	Average for 3 years 1960-63	9.4		N.A.		8.6	10.3	2467					
	1963-64	9.8	0.27	10.1	0.63	10.2	11.8	2572					
	1964-65	9.9	0.26	8.9	0.64	9.3	10.9	2691					
	Average for 2 years 1963-65	9.9		9.5		9.7	11.3	2631					
<b>Wheat</b>	Average for 3 years 1960-63	4.3		—		4.7	4.5	142					
	1963-64	3.1	0.13	4.0	0.30	3.5	3.9	103					
	1964-65	4.4	0.16	5.8	0.45	5.2	4.5	147					
	Average for 2 years 1963-65	3.8		4.9		4.4	4.2	125					
<b>Rabi jowar</b>	Average for 3 years 1960-63	3.8		—		4.2	4.8	121					
	1963-64	3.0	0.21	3.5	0.32	4.8	4.8	103					
	1964-65	3.9	0.18	4.9	0.64	4.4	4.4	134					
	Average for 2 years 1963-65	3.5		4.2		4.6	4.6	118					

\* Nagpur and Chanda.

## ANNEXURE 22.7

*Yield rates of different crops in Bhandara district separately for participant and non-participant cultivators (Quintals per hectare)*

Crop	Year	Percentage of participant cultivators	Average yield	
			Participants	Non- participants
1	2	3	4	5
Rice	1962-63	—	—	8.4
	1963-64	8	12.3	9.4
	1964-65	7	14.1	9.6
Wheat	1962-63	—	—	4.6
	1963-64	1	*	4.6
	1964-65	1	*	4.4
Rabi jowar	1962-63	—	—	3.5
	1963-64	—	—	3.0
	1964-65	—	—	3.9

\* Indicates that the average yield has not been given since observations are too few.

## ANNEXURE 22.8

Percentage distribution of fields sampled in Bhadrara district for different combinations of practices—Irrigation (I), Manure (M) and Fertilizer (F) and average yield in quintals per hectare.

			RICE						Pooled over all years								
			1962-63			1963-64			1964-65								
Practices followed			No. of fields in the class	Per centage to the total	Average yield	No. of fields in the class	Per centage to the total	Average yield	No. of fields in the class	Per centage to the total	Average yield	No. of fields in the class	Per centage to the total	No. of fields in the class	Per centage to the total	No. of fields in the class	Per centage to the total
I	M	F	15	6	11.0	27	10	13.8	18	6	16.2	60	7	13.8			
I	M	O	32	32	9.8	39	32	11.2	68	24	10.7	239	29	10.6			
I	O	F	1	†	*	5	2	17.1	2	1	*	8	1	17.6			
I	O	O	24	9	8.0	26	9	9.1	24	8	11.4	74	9	9.5			
Total			122	47	9.8	147	53	11.5	112	39	11.9	381	46	11.0			
O	M	F	8	3	6.3	10	3	9.6	13	5	11.7	31	4	9.6			
O	M	O	94	36	6.8	78	28	7.9	114	39	8.6	286	34	7.8			
O	O	F	3	1	*	6	2	8.0	3	1	*	12	1	7.7			
O	O	O	34	13	8.5	39	14	6.2	47	16	7.8	120	15	17.5			
Total			139	53	7.2	133	47	7.5	177	61	8.6	449	54	7.8			

\* Yield rate was not calculated as the number of observations was less than 5.  
 † Indicates percentage less than 0.5.

ANNEXURE 22.8—(Contd.)  
*Percentage distribution of fields sampled in Bhandara district for different combinations of practices—Irrigation (I), Manure (M) and Fertilizers (F) and the average yield in quintals per hectare*

			WHEAT												Pooled over all years		
			1962-63				1963-64				1964-65						
			No. of fields in the class	Per centage to the total	Average yield		No. of fields in the class	Per centage to the total	Average yield		No. of fields in the class	Per centage to the total	Average yield		No. of fields in the class	Per centage to the total	Average yield
1	2	3	4	5	6	7	8	9	10	11	12	13					
I	M	F	1	1	*	*	1	—	—	—	—	—	—	2	†	*	
I	M	O	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
I	O	F	4	2	*	*	—	—	—	1	—	—	7.5	1	†	*	
I	O	O	6	4	6.0	5	3	5.7	5	3	3	2	4.8	7	1	5.0	
Total			11	7	5.6	6	3	5.7	9	5	3	7.2	16	3	6.3		
O	M	F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
O	M	O	19	12	3.7	13	7	4.1	5	3	3	3.2	37	7	3.8		
O	O	F	—	—	—	2	1	*	3	2	3.1	5	1	3.1			
O	O	O	130	81	4.6	167	89	3.2	164	90	4.4	461	87	4.0			
Total			149	93	4.5	182	97	3.2	172	95	4.3	503	95	4.0			

\* Yield rate was not calculated as the number of observations was less than 5.

† Indicates percentage less than 0.5.

## ANNEXURE 22.8—(Contd.)

*Percentage distribution of fields sampled in Bhander district for different combinations of practices—Irrigation (I), Manure (M) and Fertilizer (F) and the average yield in quintals per hectare.*

Practices followed	RABI JOWAR						Pooled over all years					
	1962-63			1963-64			1964-65					
	No. of fields in the class	Per centage to the total	Average yield	No. of fields in the class	Per centage to the total	Average yield	No. of fields in the class	Per centage to the total	Average yield	No. of fields in the class	Per centage to the total	Average yield
I	1	2	3	4	5	6	7	8	9	10	11	12
O M F	—	—	—	—	—	—	—	—	—	—	—	—
O M O	11	7	3.5	8	5	3.5	2	1	*	21	4	3.5
O O F	1	1	*	—	—	—	1	1	*	2	†	*
O O O	132	92	3.5	149	95	2.9	171	98	3.9	452	95	3.4
Total	144	100	3.5	157	100	2.9	174	100	3.9	475	100	3.4

\* Average yield not calculated as the number of observations was less than 5.

† Percentage less than 0.5.

Note: Information for irrigated fields not given as the number of irrigated fields is negligible.

## ANNEXURE 22.9

*Percentage distribution of the fields sampled in Bharatara district according to the source of seed used and average yield in quintals per hectare for each source.*

Crop	Source of seed	1962-63			1963-64			1964-65		
		Number of fields in the class	Percentage of fields in the class	Average yield	No. of fields in the class	Percentage of fields in the class	Average yield	No. of fields in the class	Percentage of fields in the class	Average yield
Rice	Own source	234	91	8.6	271	96	9.7	282	97	9.8
	Cooperative society/ Government	—	—	—	4	1	*	2	1	*
	Others	24	9	7.1	7	3	5.0	5	2	9.3
Wheat	Own source	146	90	4.5	173	92	3.3	162	90	4.4
	Cooperative society/ Government	6	4	*	5	3	*	4	2	*
	Others	10	6	4.8	10	5	3.8	15	8	4.1
Rabi jowar	Own source	134	94	3.5	157	99	3.0	170	98	3.9
	Cooperative society/ Government	—	—	—	—	—	—	—	—	—
	Others	8	6	5.0	1	1	*	4	2	*

\* Yield rate was not calculated as the number of observations was less than 5.

## CHAPTER XXIII

### CACHAR (ASSAM)

#### I

23.1 Cachar district in Assam covers a total area of 6.9 thousand square kilometres. It is delimited into 15 community development blocks having 2019 villages. The total population, according to 1961 census, is 13.78 lakhs of which about 93 per cent is classified as rural. The density of population is 199 persons per square kilometre. The normal average rainfall in the district is about 335 cm.

#### *Land utilisation*

23.2 During the period 1958-59 to 1960-61, the net area sown averaged 2.00 lakh hectares which formed 29 per cent of the total geographical area. About 22 per cent of the net area sown was double cropped making the gross cropped area 2.4 lakh hectares. The area irrigated comprised about 3 per cent of the net area sown. Annexure 23.1 gives land utilisation data for the year 1958-59 to 1960-61.

#### *Cropping pattern*

23.3 Paddy is the main crop accounting for about 79 per cent of the gross cropped area. The rest of the area is shared mainly by sugarcane and oilseeds. The output of paddy during the three years 1959-60 to 1961-62 averaged 2.22 lakh tonnes per annum. The only other crop which covers any appreciable area is tea but tea plantations, being large commercial enterprises, are not the concern of the Agriculture Department. Annexure 23.2 shows the area, production and yield per hectare of the crops in the district during 1959-60 to 1961-62.

#### *Land tenure*

23.4 Only a small proportion of land is owned by individual farmers. The bulk of land is owned jointly by 2 to as many as 30 to 40 persons per holding. The size of the joint holdings varies from 0.04 hectare to 0.20 hectare. Most joint holdings are less than 0.08 hectare. The operator of a joint holding is usually one of the joint owners. He is responsible for all cash inputs and shares the output with each joint owner, retaining 40 to 50 per cent as his share. Some land-owners lease their land on either long-term or short-term basis. The tenant pays for all inputs and gets only a share of 40 to 50 per cent.

23.5 Under the Assam State Acquisition of *Zamindaris* Act 1951

which came into force on 15th April, 1954 applicable to Karimganj sub-division of Cachar district, the rights of the intermediaries in the permanently settled areas have been acquired. In Karimganj sub-division of Cachar district, the rights of intermediaries next below viz. *jotedars* and tenure holders are in the process of acquisition. In addition to the principal tenants who will come into direct contact with the State when intermediary abolition is completed, there are also subordinate tenants called *under-raiyats* and share-croppers or '*adhiares*'. A landlord can resume land from *under-raiyats* who have not acquired the right of occupancy and from share croppers on ground of personal resumption upto a maximum area of 1.2 hectares. The right of resumption can be executed within five years of the commencement of the Act. An ejected tenant or a share-cropper is entitled to restoration of the land, if not brought under personal cultivation within one year of resumption or the landlord sublets it within two years. Provision has been made for setting up *Adhi* Conciliation Boards which could order restoration of *adhiasis* illegally evicted from their holdings and regulate rents.

23.6 The crop share payable by an *adhia* is not to exceed 1/5th of the produce or value thereof if the share-cropper supplies plough, cattle etc. and  $\frac{1}{8}$ th of the same if the owner provides these. Rents paid by *under-raiyats* where paid in cash are not to exceed more than 50 per cent of the rent payable by land-owner in the temporarily settled areas. In temporarily settled areas, the maximum rent has been fixed at  $\frac{1}{8}$ th of the gross produce and 3 times the land revenue for cash rents. Legislation has been enacted for fixation of ceilings on future acquisition as well as on existing holdings, the ceiling limit being 20.20 hectares in both cases. Implementation of this legislation is in progress. A provision has been made that no *benami* transfers made after November 12, 1955 (the date of introduction of the Bill) shall be taken into account in determining the ceiling limit.

#### *Administrative arrangements*

23.7 The Deputy Commissioner is in overall charge of the programme. He is assisted by the Additional Deputy Commissioner, who is the Project Administrator. The other personnel at the district level consist of the Project Officer, 4 Subject-matter Specialists (one each in Agronomy, Farm Management, Plant Protection and Soil Science), 1 District Agricultural Information Officer, 1 Assistant District Information Officer, 1 Deputy Registrar, Cooperatives, 3 Assistant Registrars and 15 Deputy Cooperative Officers for audit and 5 Assistant Cooperative Officers for Cachar Central Cooperative Bank.

23.8 At the block level, the additional staff sanctioned for the 8 blocks comprise of 8 Agricultural Extension Officers and 80 Village Level Workers. 15 posts of Deputy Cooperative Officers have been sanctioned for the blocks. In addition, 51 Supervisors from the Central Bank are working in the blocks,

23.9 Except for the posts of Farm Management Specialist and the staff sanctioned for the Soil Testing Laboratory, almost all the additional staff sanctioned for the programme was in position.

23.10 A State level coordination committee has been constituted under the chairmanship of the Commissioner for Agricultural Production and Rural Development. A district level coordination committee has also been formed with the Deputy Commissioner as the Chairman. These committees periodically review the progress made in the implementation of the programme.

#### *Coverage*

23.11 The package programme was initiated in the district in January 1963, in 160 villages spread over 4 blocks. During the year 1964-65, the programme was extended to 819 villages in 8 blocks. The cultivated area covered under the programme was 700 hectares in 1963-64 and this increased to 24,000 hectares in the year 1964-65, representing about 10 per cent of the total cultivated area in the district.

23.12 The number of farm plans prepared was only 400 in the year 1963-64 and it went up to 14070 during the year 1964-65. The Package Programme was launched in Cachar in the background of an agricultural situation which had consistently resisted the impact of a decade of normal agricultural extension work. The programme had to deal, on the one hand, with unresponsive agriculturists and, on the other, with moribund cooperatives.

#### *Fertilisers*

23.13 The offtake of both nitrogenous and phosphatic fertilisers in the district prior to the introduction of the programme was hardly 70 tonnes. Under the impact of the programme, the offtake of both these fertilisers taken together has gone up to 243 tonnes during the year 1963-64 and to 1613 tonnes in 1964-65. The table below shows the offtake of chemical fertilisers :

*Distribution of Fertilizers (Tonnes)*

Year	Nitrogenous (in terms of ammon. sulphate)	Phosphatic (in terms of super-phosphate)
1962-63 (Pre-package)	37	33
1963-64	128	115
1964-65	790	823

Since the primary societies in the district are not in a position to take up the distribution of fertilisers, the Agriculture Department undertakes fertilizer distribution through the VLWs. Chemical fertilisers, particularly muriate of potash, for which there is ample demand are not readily available and transport difficulties come in the way of timely imports from outside.

#### *Improved Seeds*

23.14 The Government seed and demonstration farms numbering 9 are being used partly as demonstration units and partly for growing improved varieties. Pending sanction of the seed testing laboratory by the Government of India, each *Gaon Sabha* has been divided into four zones and one zone in every *Gaon Sabha* was taken up during 1963-64 for seed saturation programme. Foundation seeds of crops other than paddy used in demonstrations are at present not produced in requisite quantities in the district. Paddy seed production did not materialise during the year 1962-63 because of floods and other hazards. During 1963-64, 142 tonnes of improved seeds were distributed and this increased to 270 tonnes in 1964-65.

#### *Plant Protection*

23.15 Being in heavy rainfall belt, the incidence of crop pests and diseases is high in the district. During 1963-64, the paddy crop faced fairly wide-spread attack of *hispa*, a case-worm and moderate attack of blast and foot-rot. Extensive preventive and protective measures were taken to reduce the incidence of the diseases and prevent their spreading. The progress made in plant protection measures is given in the table below :

Year	Area treated aga- inst pests and diseases (hectares)	Seed treated (tonnes)	Pesticide formu- lations used (tonnes)
1963-64	2600	108	9.00
1964-65	2395	371	13.40

#### *Improved Implements*

23.16 The building to house the implements workshop is being constructed. The procurement, stocking and distribution of improved implements is mostly done by the Agriculture Department. At present hand-tools are used extensively even for land preparation because of the small size of holdings and shortage of bullock power.

*Demonstrations*

23.17 Demonstrations envisaging simultaneous use of the package of recommended practices for each crop are being laid on cultivators' fields. During 1963-64, 1463 demonstrations were laid in all, while during the year 1964-65, the number of demonstrations laid was 1351. The results of demonstrations laid during 1964-65 have shown that the yield of paddy in demonstration plots as compared to that of 'control' plots was 43 to 47 per cent higher. The cost-benefit analysis of the demonstration data show that by spending one rupee on the recommended package of practices the cultivator gets an additional yield worth Rs. 1.25 to Rs. 1.77.

*Soil Testing*

23.18 The soil samples are analysed at the laboratory at Jorhat. Plans for the construction of a new soil testing laboratory are being finalised. During 1963-64, 361 soil samples were collected and tested and an equal number of recommendations made in the field. The number of soil samples collected and tested during the year 1964-65 was 252 and the number of recommendations made in the field was the same.

*Cooperative Credit and Marketing*

23.19 The primary cooperative credit societies covered 98 per cent of the villages and 44 per cent of the agricultural population in the district in 1964-65. Between 1962-63 and 1964-65, their number fell from 821 to 668, their membership declined from 0.84 lakh to 0.83 lakh and their share-capital shrunk from Rs. 10.00 lakhs to Rs. 9.89 lakhs. There was, however, an increase in the deposits with these societies from Rs. 0.42 lakh to Rs. 0.72 lakh as also an expansion in the volume of loans advanced from Rs. 7.57 lakhs to Rs. 9.81 lakhs during the same period. The overdues of cooperatives which stood at nearly 86 per cent in 1962-63 came down to 77 per cent during 1964-65 as the result of an intensive collection drive.

23.20 A scheme for revitalisation of the credit societies is being implemented in the district with a view to reviving the flow of credit and thereby, reactivising the credit societies. The terms and conditions for credit accommodation to the societies have been suitably liberalised. Short term loans upto Rs. 500 are issued on personal surety basis.

23.21 In addition to cooperative loans, the State Government advanced *taccavi* loans to agriculturists to the tune of Rs. 1.30 lakhs in 1962-63 and Rs. 0.66 lakh during 1963-64.

23.22 The membership of the Central Bank in the district witnessed a rise from 760 in 1961-62 to 806 in 1964-65 and its share capital from Rs. 4.85 lakhs to Rs. 8.41 lakhs. The deposits with the Central Bank went up from Rs. 1,75 lakhs in 1961-62 to Rs. 6.50 lakhs during 1964-65.

23.23 There were only 13 primary marketing societies in the district during the period 1962-63 to 1964-65. Their membership, however, increased from 1929 to 2209 and share capital from Rs. 3.30 lakhs to Rs. 3.32 lakhs during this period. These societies marketed agricultural produce valued at Rs. 4.98 lakhs in the year 1962-63 which increased to Rs. 7.63 lakhs during 1963-64 and further to Rs. 17.10 lakhs in 1964-65. Only small amounts of Rs. 0.02 lakh and Rs. 0.60 lakh were recovered during 1963-64 and 1964-65 respectively by the cooperative marketing societies.

#### *Storage Godowns*

23.24 As against 300 godowns needed to saturate the district, 20 godowns were existing as in June, 1964 and 7 were under construction. During the year 1964-65, 13 godowns were added to the number existing last year making the total number of existing godowns as in June, 1965 to 33, the number of godowns under construction being 32.

#### II

#### *Results of crop-cutting surveys, 1963-65*

23.25 The assessment surveys were initiated in the year 1963-64 in the district and since then they are being repeated annually. Under the survey, 800 cultivators' holdings are annually selected for agronomic and agro-economic enquiry and 600 fields are selected for yield assessment of paddy (both autumn and winter crops) which is the principal crop of the district, accounting for about 95 per cent of the gross cropped area. On account of the peculiar location of the district, no suitable control area could be chosen for the district. In this section, the results relating to crop-cutting surveys for the years 1963-64 and 1964-65 are discussed.

23.26 It may be seen from Annexure 23.4 that during 1964-65, average yields of both autumn and winter rice were higher than those for the year 1963-64. Such increases were not noticed for the Assam State as a whole excluding Cachar district. Almost the entire area under paddy in the district was rainfed. During the year 1963-64, none of the sampled fields received fertilizer application, while in the year 1964-65 about 5 per cent of the sampled fields received the benefit of fertilizer application. The yields of the fertilized fields were of a higher order as compared to fields not receiving fertilizer. The use of improved seed was limited to 8 per cent of the sampled fields. Adoption of plant protection measures was almost absent.

## ANNEXURE 23.1

*Land Utilisation and Irrigation, Cachar (Assam)*

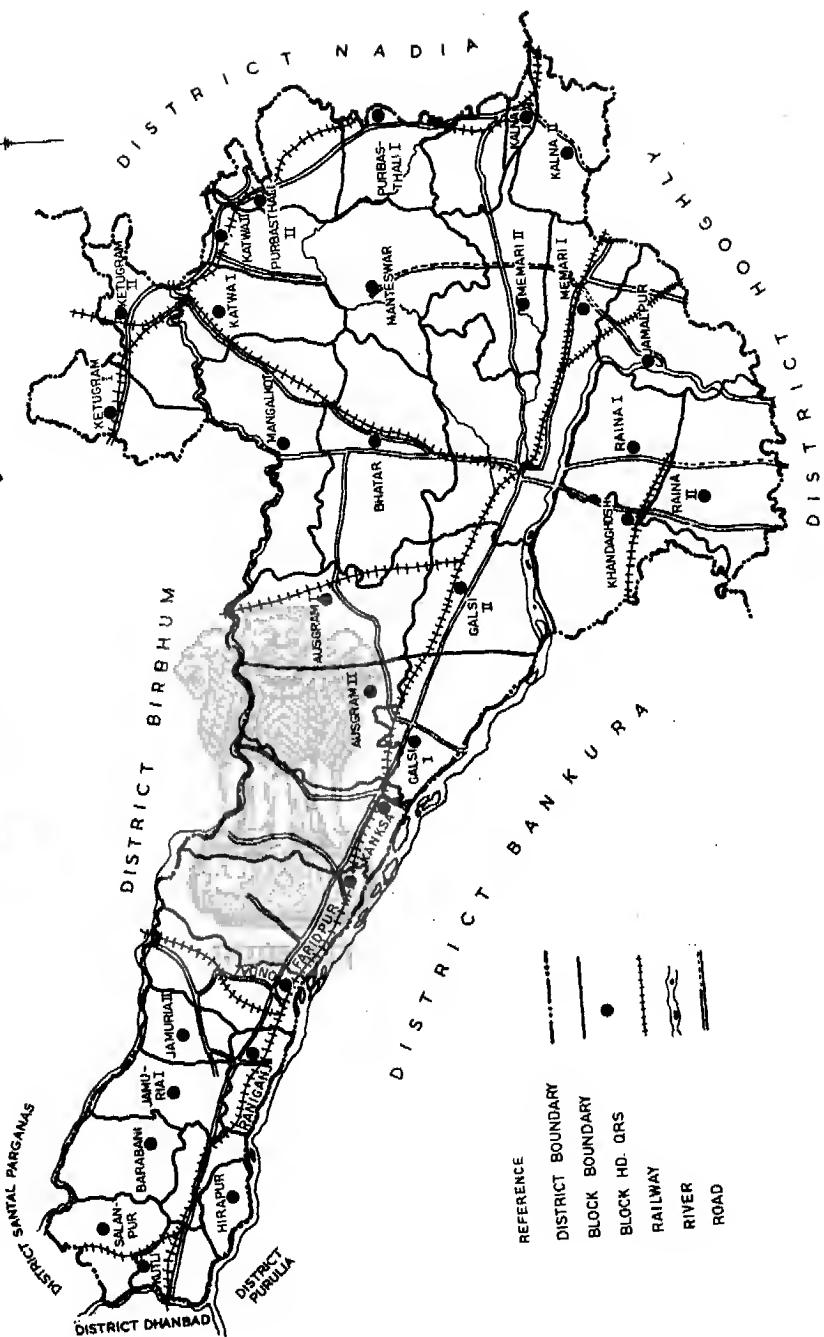
(00 Hectares)

S. No.	Type of area according to use	1958-59	1959-60	1960-61	Average
1.	Geographical area	6908	6908	6908	6908
2.	Forest	2453	2453	2450	2452
3.	Barren & uncultivable land	811	796	795	801
4.	Land put to non-agricultural uses including home steads, grave yards roads, canals, lakes etc.	529	542	551	541
5.	Cultivable waste	60	57	53	57
6.	Permanent pasture	69	69	69	69
7.	Land under miscellaneous tree crops and groves not included in the net area sown	331	331	331	331
8.	Current fallows	300	283	280	288
9.	Fallow land other than current fallows	410	377	338	375
10.	Net area sown	1951	2005	2043	2000
11.	Net area sown expressed as percentage of geographical area	28.2	29.0	29.6	29.0
12.	Area sown more than once	406	462	437	435
13.	Area sown more than once expressed as percentage of net area sown	20.8	23.0	21.4	21.8
14.	Gross cropped area	2357	2467	2480	2435
15.	Net irrigated area	55	55	55	55
16.	Net irrigated area expressed as percentage of net area sown	2.8	2.7	2.7	2.8

**DISTRICT  
BURDWAN  
WEST BENGAL**

MILES 2 3 4 5 6 7 8 9 10 11 12 MILES  
SCALE

DISTRICT MURSHIDABAD



REFERENCE	DISTRICT BOUNDARY
	DISTRICT BOUNDARY
	BLOCK BOUNDARY
	BLOCK HQs
	RAILWAY
	RIVER
	ROAD

**ANNEXURE 23.2**  
*Estimates of Area, Production and Yield of Major Crops—Cachar (Assam)*

Crop	Area (Hectares)				Production (Metric Tons)				Yield (Quintals per Hectare)			
	1959-60	1960-61	1961-62	Average 1959-62	1959-60	1960-61	1961-62	Average 1959-62	1959-60	1960-61	1961-62	Average 1959-62
1	2	3	4	5	6	7	8	9	10	11	12	13
1. Rice	186153	189957	201652	192601	199537	225247	240085	221623	10.72	11.86	11.90	11.5
2. Maize	61	61	61	61	30	30	34	31	4.92	4.92	5.57	5.1
3. Total cereals	186214	190018	201753	192662	199567	223277	240119	221654	10.72	11.86	11.90	11.5
4. Tur	81	71	69	74	55	52	50	52	6.79	7.32	7.25	7.0
5. Sesamum	162	170	81	138	81	82	31	65	5.00	4.82	3.83	4.7
6. Rape & mustard	1619	1619	1619	1619	1053	827	541	807	6.50	5.11	3.94	5.0
7. Linseed	101	105	81	96	40	43	31	38	3.97	4.10	3.83	4.0
8. Total oil-seeds	1882	1894	1781	1853	1174	952	603	910	6.24	5.03	3.39	4.9
9. Sugarcane (Gur)	3804	3521	3561	3629	11097	13162	12130	12130	29.17	37.38	34.06	33.4
10. Cotton	33	61	61	52	3.6	4.4	4.4	4.1	1.09	0.72	0.72	0.8

## ANNEXURE 23.3

*Additional staff sanctioned and in position for IADP, Cachar*

S. No.	Category	Additional staff sanctioned			Additional staff in position as on			
		Per block	as on 30th June 1963	1964	1965	30th June 1963	1964	1965
1	2	3	4	5	6	7	8	9
<b>A. Block Level :</b>								
1.	Agricultural Extension Officer	1	4	4	14	4	4	14
2.	Village Level Worker	9	38	38	140	38	38	69
3.	Cooperative Extension Officer		15	15	15	15	15	15
4.	Cooperative Supervisor					51 Supervisors from the Central Bank and 3 Asstt. Co-op. Officers from the Deptt. are working in the Blocks.		
<b>B. District Level :</b>								
1.	Project Administrator	—	1	1	1	1	1	1
2.	Project Officer-cum-Distt. Agril. Officer	—	—	1	1	—	1	1
3.	Subject-matter Specialist	—	4	4	4	3	4	3
4.	Dy. Registrar	—	1	1	1	1	1	1
5.	Dy. Coop. Officer	—	15	15	15	15	14	14
6.	Executive Officer	—	—	1	1	—	1	1
7.	Other Supervisory Staff	—	—	5	5	—	5	5
8.	Asstt. Registrar	—	1	1	1	1	1	1
<b>C. Agricultural Information Unit :</b>								
1.	Distt. Agril. Informn. Officer	—	1	1	1	1	1	1
2.	Asstt. Distt. Agril. Informn. Officer	—	1	1	1	1	1	1
3.	Photographer	—	—	1	1	—	—	—
4.	Projectionist	—	—	1	1	—	—	1
5.	Artist	—	—	1	1	—	—	1
6.	Asstt. Press Operator	—	—	1	1	—	—	—

## ANNEXURE 23.2 (Continued)

1	2	3	4	5	6	7	8	9
<b>D. Agricultural Implements Workshop :</b>								
1.	Agricultural Engineer	—	—	1	1	—	—	1
2.	Asstt. Agril. Engineer	—	—	1	1	—	—	—
3.	Workshop Blacksmith	—	—	5	6	—	—	5
<b>E. Soil Testing Laboratory :</b>								
1.	Asstt. Soil Chemist	—	—	1	1	—	—	—
2.	Research Assistant	—	—	2	2	—	—	—
3.	Scientific Assistant	—	—	4	4	—	—	—
<b>G. Benchmark Survey :</b>								
1.	Statistician	—	—	1	1	—	1	1
2.	Statistical Inspector	—	—	2	2	—	2	2
3.	Statistical Assistant	—	—	1	1	—	1	1
4.	Statistical Supervisor	—	—	9	9	—	9	9
5.	Investigator	—	—	2	2	—	2	2

## ANNEXURE 23.4

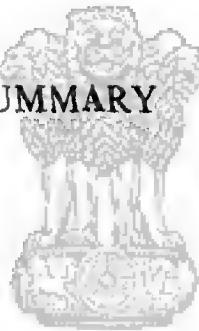
*Yield rate in quintals per hectare and production of Rice in Cachar district, Assam State and comparable areas*

Crop	Year	IADP district		Average yield in the State excluding Cachar district	Production ('00 tonnes)	Value of production (Rs. in lakhs)
		Average yield	Standard error			
1	2	3	4	5	6	7
Rice (Autumn)	1963-64	9.1*	N.A.	7.3	462	258
	1964-65	10.2	0.23	6.7	495	276
Rice (Winter)	1963-64	11.7	0.24	10.8	1799	1004
	1964-65	13.5	0.28	9.3	2124	1186
Average for 3 years						
1960-63		10.8	N.A.	9.0	2073	1157
Rice (Combined)	1963-64	11.1	N.A.	10.0	2207	1232
	1964-65	12.5	0.21	8.7	2573	1437

\* Based on the State series.

Note:— Value of production is worked out on the basis of the State harvest price for the year 1960-61.

### **III. SUMMARY**



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## CHAPTER XXIV

### PROGRESS AND PROSPECTS

24.1 The Intensive Agricultural District Programme was taken up in 1960-61, initially for a period of five years, with the objective of achieving a rapid increase in agricultural production through an integrated and intensive use of improved agricultural techniques and by providing sufficient production incentives to the farmers. The programme envisaged the selection of districts with maximum of irrigation facilities and minimum of natural hazards.

24.2 *Prima facie*, the programme completed five years of operation in 1964-65. But, in practice, it has been effectively on the field in most of the districts for a much shorter period. Of the first group of seven districts, only three were started in 1960-61 and the rest in 1961-62 and of the second group of eight districts, six were launched in 1962-63 and two in 1963-64. Besides preparatory action for launching the programme like sanction of posts, selection and posting of staff and their training, arrangements for supplies, credit and works took one year to eighteen months. Thus, the maximum period for which the results of the programme are available for any district is 3½ years which is considered, by all standards, too short a period for a definitive evaluation of any agricultural programme of this nature. The conclusions presented in this report should, therefore, be considered as only tentative.

24.3 The relevant data regarding the success and failure in each district and the reasons for the same have been given in some detail in the respective chapters. It is, therefore, not necessary to repeat them here. In some of the districts, the failure may be partially ascribed to adverse weather conditions. In a few cases, the selection of the district itself was not particularly happy inasmuch as the basic natural conditions necessary for the success of such a programme did not obtain. But in most cases, a large part of the gap between promise and performance could be ascribed to the shortage of essential inputs and short-comings of the administrative system. While judging the comparative performance of the programme in various districts, it may be well to remember that the different districts were at varying levels of agricultural development at the time of the commencement of the programme.

24.4 While assessing the performance, it is also important to emphasise that the IADP is essentially a pilot project in the nature of a "path-finder" experiment and that in any such experiment, positive as well as negative results are only to be expected. While the utility of the positive results

lies in the possibilities that they indicate for extension to other areas, the study of the negative results helps to focus attention on the shortcomings of the programme and provide guide-lines for its improvement. A balanced view is, therefore, essential for assessing the benefits following from the programme.

24.5 Another basic idea to which attention requires to be drawn is that in addition to a "path-finder" experiment, the IADP is also expected to be a "pace-setter" demonstration programme and, as such, to influence all the neighbouring areas. But it is also an essential part of the concept that this should be achieved not by diluting in any way the efforts in terms of material and human resources put in the IADP area itself but only by inducing the other areas to emulate the IADP example to the extent possible within the limited resources available to them. To the extent that the IADP influences the neighbouring areas, the difference in the performance of the two would, no doubt, tend to be somewhat less than what it would have been otherwise. But if the progress made in the IADP area also induces similar progress in the neighbouring areas and, as a result, the difference between the two areas tends to narrow down but at a higher level of production, that should be considered a point in favour of the IADP rather than a point against it. The important thing is that, whatever be the difference between the IADP and the neighbouring districts, the former should always continue to be the "path-finder" and "pace-setter".

24.6 However, any programme of this kind, even assuming that all the requisites of farm assistance are made available in an efficient manner, has to be taken through different stages. The initial period has to be devoted to preparing the ground-work for successful operation. This is a period when adequate administrative arrangements have to be made for selection and recruitment of the needed personnel, their training, creating or strengthening of village institutions like cooperatives in the field of credit, supplies and marketing, timely and adequate provision of production requisites like fertilizers, pesticides, improved seeds etc., and building up of effective methods of extension and education. In a big country like India, where illiteracy rate is high and communications are poor and the message of scientific agriculture has to be carried mainly by word of mouth by large number of extension agents of widely varying degree of ability, their recruitment, training and upgrading alone would take a considerable time. This preparatory phase has to be followed by introducing a change in the existing practices of raising crops by a simple package of improved practices based on latest research findings. This phase of the programme may be termed as "educational action" programme where a process of change from traditional farming to scientific farming is being introduced. The work in the IADP districts has, so far, been confined mainly to this phase of the programme.

24.7 Performance of various districts has to be judged in the light

of the progress made in (i) making the administrative arrangements for introducing the programme; (ii) creating or strengthening the cooperative institutions in the fields of credit, supplies and marketing; (iii) developing effective methods of farm planning, demonstration trials; etc. for inducing the farmers to use improved practices; (iv) availability of adequate inputs and adoption of improved practices and (v) resultant increase in agricultural output.

*Administrative arrangements for introducing the programme*

24.8 Although the organisational arrangements for educating and persuading the farmers to adopt improved practices and for developing an effective and dynamic institutional structure to provide the whole range of leadership, services and supplies required within a district to have a dynamic and increasingly productive agriculture, were not unsound in conception, their actual implementation had left much to be desired.

24.9 It may be recalled that the IADP was intended to be nationally led as a rapid moving programme even though the detailed operations were to be the responsibility of the participating State Governments. At the national level, this assumed continuity of a top administrative leader, supported by a strong office of National Project Director. In practice, however, there has been no continuity at the highest level inasmuch as there were four different administrative leaders in four years. The programme had, no doubt, a Project Director who continued throughout the period under reference. But this office lacked adequate supporting staff. The result was that top administration was unable to provide the requisite leadership at the field level and had to rely largely upon issuing directives from the headquarters to State Governments.

24.10 At the district level, the Collector was expected to provide the necessary leadership. But in most of the States, the system of rotation of Collectors and the exigencies of administration led to their frequent transfer so that very few Collectors remained long enough in a district to get to know the district really well and understand fully the programme needs. The concept was that below the Collector, there would be a District Project Officer who should have adequate authority, resources and flexibility. With a few exceptions, the Project Officers were competent men, but the administrative procedures were such that they lacked adequate control over the budget and the staff, and in some cases even over operational matters, and often felt frustrated for want of adequate delegation of powers.

24.11 The Project Officers generally adapted themselves well to their job of being IADP planner, organiser and leader of the intensive effort rather than being only a technician. They required, however, about a year to learn the new job. Future staff planning should, therefore, provide

special training for District Project Officers before assigning them to their job.

24.12 District technical specialists form the key personnel who have to play a progressively larger role. These specialists, however, did not play that important role which was expected of them for the following reasons. Firstly, many of them were not adequately trained for the speciality to which they were assigned when they came to the job; they were specialists only in name but not in detailed knowledge of their subject-matter. Secondly, four technical specialists for a district proved rather inadequate to provide the help needed for a rapidly moving intensive programme. To a considerable extent, however, this lacuna has now been corrected in most IADP districts. Thirdly, the specialists have not been sufficiently mobile to do their job well for lack of adequate transport facilities. They were expected to undertake studies of the local conditions affecting productivity. With only two jeeps available for the headquarters-staff, lack of adequate transport has hampered the conduct of such studies, thereby not assisting the programme in solving many problems that arose in the district.

24.13 Delay in the recruitment of block-staff also hampered the work in the earlier years. Most of them are now in position especially in the first group of 7 districts. Basic training at all levels (BDO, Extension Officer or VLW), however, proved less than adequate for the intensive effort being organised. While inservice training carried on both seasonally and annually has now bridged the gap to a considerable extent, the need for more thorough basic training for staff who are to work in intensive agricultural development is clearly evident.

24.14 Another organisational shortcoming—and it is significant—is that the block staff is not sufficiently under the control of the District Project Officer. The latter needs to have substantial control over those assigned to the intensive effort, if he is to have a really intensive fast-moving programme. Too often he finds the time and energy of some of the key block staff assigned to non-agricultural work, at a time when full time and intensive effort must go into the programme if it has to have the desired quality and speed. Not uncommonly he finds the State administration exerting a prior claim on the time of VLW sand BDOs and the agricultural programme suffering as a consequence. This has been true even though on paper VLWs are assigned full time to agricultural work. It is true that other aspects of village development also need attention. While several alternatives are possible, the proposal to assign the VLWs who are more competent in agriculture to full-time agricultural work and the others to different phases of local development has much merit as it would substantially improve the intensive agricultural effort.

24.15 Based on the experience of the last four years, several staff

improvements are needed if a rapid progress in increasing agricultural production is to be achieved. The most important are : (i) to keep all posts filled with the best qualified staff available; (ii) to delegate maximum possible powers at each level and permit an officer at a particular level to depart from the prescribed procedure in what he considers to be an emergency, provided he keeps his immediate superior officer duly informed and the latter simply certifies that he has no reason to doubt the *bonafides* of the former; (iii) to fix specific responsibilities for individual members of the block staff and ensure intensive supervision; (iv) to assign competent VLWs to agriculture to carry the programme forward rapidly while providing other help for general village development; and (v) to keep experienced and capable staff in place while providing promotional opportunities, improved working and living conditions where these are sub-standard and adequate incentives to promote effective working. Some turn-over in staff is inevitable even if the policy of continuity of staff is made effective. In view of this, the substitute should be put in position at least two months before the staff member to be transferred actually leaves so that there may be no interruption in the programme and the new-comer may benefit from the experience of the officer he is replacing. For this purpose, provision of a larger training and leave-reserve also seems necessary.

24.16 As regards the office of the District Collector, it is essential that the same person be kept in the district for four to five years so that he may know enough about the agricultural and cooperative needs of the district to do his job well. Where this cannot be done, the District Collector should be relieved of his responsibility for the IADP and full responsibility and authority should be given to the District Project Officer so that the programme can have the needed leadership.

24.17 It is important to recognise clearly that the staffing pattern has not only to vary from area to area but also to change as an area moves up from a lower level to a higher level of technology. The pattern has, therefore, not only to be tailor-made for each area *ab initio* but also to be carefully reviewed and revised periodically. The introduction of the somewhat sophisticated pattern (described as Stage II in Chapter IV) in 38 blocks, where more intensive effort is put in, is, therefore, a move in the right direction but is not enough. There is not only a need for introducing an even more sophisticated pattern (described as Stage III in the same Chapter) where comprehensive farm planning is introduced and a larger number of block level technical staff rather than VLW is provided in some of the more advanced blocks but there has also to be a greater number and variety of experiments in other blocks at different levels of development. In this context, the pattern introduced in certain other countries of augmenting the technical staff at the block headquarters and using the latter as a training-cum-servicing centre for the farmers and replacing alsaried VLWs

by progressive farmers who are paid on a commission basis on the progress achieved, also deserves to be tried out in certain blocks. It should be recognised that the pattern which is suitable for, say, Raipur, may not be suitable for, say, Ludhiana and what is suitable even for Ludhiana in the earlier years may not be adequate in later years. While experiments involving large additional resources have naturally to be considered and approved at the national level, the District Project Officer should not only be permitted but also encouraged to try out such experiments with both procedure and staff-pattern as may be undertaken mainly by readjustment within the approved budget. Requests for small additions to the budget for purposes of such experiments should be sympathetically considered. Innovation is the essence of progress and should be a built-in feature of a "path-finder" project like the IADP.

24.18 The District Cooperative Officer has to play an important role but he has been in practice considerably less effective. This, however, is not so much due to the quality of men assigned as to the lack of a well-planned, rapidly-moving development programme for the village cooperative to support that on the agriculture side.

24.19 *In-service Training:* The redesigning and upgrading of in-service training for IADP staff has been one of the outstanding features of the programme. Initially, it was found that the staff lacked the understanding, programme-skills and team-work abilities needed to mount a broadly-based, intensive, rapidly-moving programme for stimulating, encouraging and guiding large number of farmers and assisting co-operatives. The key to successful development of the needed inservice training was that it was under the control of the District Project Officer. He was in a position to make it an integral part of the whole intensive programme operation. And this he soon learnt to do. Even though much of the effectiveness of his efforts has been dissipated due to frequent staff turn-over, the pattern and the organisation of inservice training needed are clear and much progress has been made.

24.20 The staff training had to be organized into three closely related parts. One was orientation training as to what is required to have fast moving agricultural development in the district, block and village and the parts to be played by policy, programme, staff, institutions, local leaders and farmers themselves. A second part was the need for full understanding of the package of improved practices and the practical subject-matter background of it. This included problems of adjusting the packages to fit local conditions so that they may give good results and be popular with the farmers. The generalised and quite inadequate practice-packages of the first year were progressively modified and improved as new information and experience became available so that they could give much better results in farmers' hands. The third part was how to organise and carry out detailed

"how to do it" training so that the extension worker would possess technical skill and needed education to match his increased subject-matter knowledge. This was done in the field in small groups rather than at district headquarters.

24.21 In order to make this training highly practical and effective, the district specialists themselves received special training at the regional and the national level.

*Creating or strengthening co-operative institutions in the fields of credit, supplies and marketing*

24.22 *Co-operatives:* Co-operatives in the IADP districts have undoubtedly made some progress. There has been considerable increase in the membership and paid-up capital of co-operatives in all the districts. A large number of co-operative stores and godowns has been built and substantial supplies have been handled. Marketing activities have also shown some increase. As regards credit, there has been an expansion in loans advanced from Rs. 11.91 crores in 1961-62 to Rs. 12.07 crores in 1964-65 in the first group of 7 districts and from Rs. 6.48 crores in 1962-63 to Rs. 8.07 crores in 1964-65 in the second group of 8 districts. Among the first group of districts, Ludhiana and Aligarh have shown steady progress, whereas Thanjavur, Raipur and West Godavari have shown a definite decline. This decline in the loans advanced is there inspite of the fact that membership of the cooperatives has increased.

24.23 Results from the bench-mark and assessment surveys have, however, indicated that in a number of districts, even now, more than three-fourths of the borrowings are made from traditional money-lenders and for such borrowings, rates of interest paid are as high as 25 per cent, as may be seen from Table 24.1.

Table 24.1

*Requirements of loan met by agencies other than Government or Co-operatives.*

District	Percentage of the requirement of loan met by agencies other than Government or Cooperatives			Average rate of interest charged by these agencies		
	1962-63	1963-64	1964-65*	1962-63	1963-64	1964-65*
Thanjavur	—	42	69	—	18	20
West Godavari	55	60	72	11	11	14
Shahabad	27	38	31	13	18	15
Raipur	27	44	36	12	24	31
Aligarh	76	75	61	25	25	26
Ludhiana	9	2	2	11	13	13
Pali	73	86	84	17	20	24

\*Figures are provisional.

It is important that the cooperatives should make every effort to step up the proportion of cooperative credit substantially by suitably modifying their lending policies and procedures as also equip themselves adequately in terms of resources and personnel.

24.24 It would appear that although the co-operatives have made some progress, yet the development has not been adequate to meet the requirements for a rapid increase in food production. There are several reasons for this situation, some within the cooperative sector and others outside. Strong, viable and effective local cooperatives cannot be built up quickly. Typically, the present service-cooperative is too small to become a really effective service institution. Prescribed margins, which are often too small to cover the cost of carrying and handling supplies, seriously restrict the possibility of a cooperative building up its financial strength and viability. The kind of educational programme needed to build local cooperative leadership and understanding among members and potential members has been generally lacking. Procedures are often cumbersome and result in irritating delays. Loans advanced are sometimes too little and too late. Rules and regulations under which the cooperatives operate lack flexibility and do not help promote local initiative and staff competence. But some of the reasons for this situation also lie outside the scope of the cooperative organisation, such as difficulties in ensuring adequate supplies, effective extension and appropriate coordination with the other agencies participating in the programme, etc.

24.25 The failure of the cooperatives to collect loans and attract deposits has been one of their weakest features. In many IADP areas, farm income has been rising rapidly with increase in agricultural production. Even under these conditions, the overdues of cooperatives have been rising more often than not, a clear indication of an ineffective loan collection system. Their deposits also have been seriously lagging behind. Promotion of thrift and mobilization of the farmers' savings in the form of deposits should have been one of the most important functions of the co-operatives. But very few people in the State cooperative departments as well as in the cooperatives themselves, now-a-days, pay the needed attention to this aspect. The cooperatives have, thus, become only a loan-disbursing agency and not an agency for popularising the banking habit in the rural areas and mobilising rural savings. Unless a special effort is made to change this attitude, it is unlikely that the cooperatives will be able to discharge effectively the functions which are expected of them in the IADP. It is true that building up of effective cooperatives takes considerably longer time than what the IADP districts have had so far. Even so, if requisite policy changes could be made and an effective cooperative development programme organised in each IADP district, the time necessary to build strong and effective cooperatives could be gradually shortened, compared

to the slow progress being made now. It is to serve such a purpose that a comprehensive action-programme, designed to improve the operational efficiency of the cooperative credit institutions and bring about the required reorientation of their lending policies, was formulated and circulated by the Union Ministry of Community Development and Cooperation in March 1964. It is yet to be seen how far this programme is effectively implemented and enables the cooperative agency to fulfil the role envisaged for it in relation to the IADP. Even with this action-programme, there may still be areas where the cooperatives do not show sufficient promise of early improvement and supplementary arrangements may have to be considered for the provision of production-credit, ensuring at the same time that such transitional arrangements do not hinder future co-operative development but as far as possible encourage it. It is from this perspective that the proposal to set up an Agricultural Credit Corporation, as a complementary and transitional system, in some of the States where cooperatives are lagging behind, has to be considered.

**24.26 Marketing and Processing:** Establishment of marketing societies was a part of the IAD Programme so that the farmers may derive full benefit from their increased production. But the progress in this direction has been rather slow. Some efforts have been made to bring credit and marketing together so that the repayment of the member's cooperative loan for financing his higher production plan can be paid for as he markets his crop through the local cooperative. The uncertainty that the farmer faces about selling his produce at a remunerative price and buying the inputs at a fair price can thus be substantially reduced. Some progress has, no doubt, been made in this direction but a large-scale effort of this kind must await the time when local cooperatives are strong enough for making such a system effective.

**24.27** An important change in the processing field that has occurred in the IADP areas is the setting up of a fully modern paddy-storage and rice milling facility in each of the seven more important rice-producing districts. Preliminary evaluation of these mills indicates that they are increasing the out-turn of rice per tonne of paddy milled by 2 to 4 per cent over sheller-mills and 3 to 6 per cent over huller-mills. They are also producing milled rice of higher quality. They are proving to be considerably more efficient in the use of capital, power and labour per tonne of rice milled than the older type. Modern and efficient rice milling machinery has been imported from Germany and Japan for these mills. Arrangements are now being made to produce rice machinery of similar size, quality and efficiency within the country. Local manufacturers and contractors are also making drying and conveying equipment and constructing silos for modern handling and safe storage of paddy. Plans are under development for similar installations for other foodgrains such as wheat and maize and for

groundnut-processing.

*Development of effective methods for inducing the farmers to use improved practices*

24.28 *Farm Planning*: Farm planning as a tool of extension has been tried on a large scale in India for the first time in the IADP districts. This technique is comparatively new. But, on the whole, it has helped in establishing effective contacts with the farmers and in assisting them to move, step by step, towards scientific farming. However, the concept of comprehensive farm planning with which the IADP was started, proved too complicated for the average farmer and hence unworkable in most areas in the initial period. As a result, some valuable time was lost. It was only when, in the light of this experience, a simple farm plan was substituted for the comprehensive farm plan, that the programme turned out to be more acceptable to farmers and gathered momentum. The number of farm plans prepared increased from 2.06 lakhs in 1961-62 to 6.77 lakhs in 1964-65 in the first group of 7 districts and from 1.36 lakhs in 1962-63 to 4.57 lakhs in 1964-65 in the second group of 8 districts. Farm planning, backed by an assurance to provide the needed credit and inputs, has now become a vital link in the working of the IADP staff with the farmers. It has become a powerful instrument for introducing the farmer to improved methods, making him more efficiency-minded and economy-conscious and inducing him to demand larger supplies of inputs which are likely to increase his net return; in short, to modernise his agriculture.

The reliance on the simple farm plan has, however, resulted in more or less standard patterns being prescribed in different areas. Relatively greater emphasis put on fertilizers has often led to a neglect of the other less spectacular but no less essential components of the package of practices. While such standard patterns are unavoidable in the initial period, especially when dealing with a large number of small farmers, it is important that they should be gradually substituted by tailor-made plans for each farm as soon as the sophistication of the farmers, especially the bigger ones, improves sufficiently. A beginning has, no doubt, been made in this direction in the Stage II villages, but greater attention to this aspect seems necessary.

The farm planning technique, at the moment, suffers from lack of adequate research data on which to base extension recommendations in different areas for different crops, lack of adequate understanding of farm planning processes both by the field extension staff and the cultivators and the limited experience of credit institutions in extending production-oriented loans. It is, however, expected that with more experience of farm planning by the extension staff and farmers, the programme will move forward, more rapidly, in the coming years.

24.29 *Village, Block and District Planning*: In addition to the develop-

ment of farm plans for individual cultivators, some attempt has been made in the IADP districts to develop village, block and district plans of work, but it is not yet very significant. A sound development of these plans requires a fuller understanding of the programme-planning processes, training of the staff in the technique of programme-development as well as providing them timely and adequate information on outside resources that would be available during a given period. These limitations have stood in the way of proper development of village, block and district plans so far. There seems to be a feeling that, in the IADP districts, the utmost that can be attempted in the near future is to have a broad district plan of work. But village and block planning, to cover activities that require community-action, such as irrigation and drainage system, soil conservation, land reclamation, plant protection on area basis etc., as a complement to farm plans, should be an important element of the IADP. Experience shows that if the tailor-made "package of improved practices" for individual farmers is not supplemented by a similar tailor-made "package of works" for the village as a whole, it is not possible to derive full benefit from the programme. Although a beginning has been made in this direction in the Stage II villages, sufficient emphasis has unfortunately not yet been put on the implementation of a "package of works" as a counterpart of the "package of practices" in most of the areas. There is often inadequate coordination, for instance, between irrigation and intensive cultivation programmes and progress is held up because even relatively small but essential works are not attended to in time or in a related manner.

**24.30 Field demonstration:** Considerable importance has been attached under the IADP to field demonstration, mainly of a composite type, which constitutes a most effective tool for motivating farmers to adopt improved production practices. On the whole, these demonstrations have now come up to a fairly high standard from the technical stand-point and have invariably shown the superiority of the recommended practices over the traditional methods. These demonstrations have, however, revealed that the return on the investment in the recommended package of practices varies considerably from district to district, ranging from  $1\frac{1}{2}$  times in Pali and Surat to over 3 times in Ludhiana, Burdwan, Raipur and Mandya. The emphasis in IADP districts is now on a smaller number of really good demonstrations, instead of a large number of demonstrations of indifferent quality as was the rule in the past. Another encouraging development in the IADP districts has been the organization of area-wide demonstrations where improved practices are demonstrated in action over fairly large compact areas. The visual effect of such demonstrations is found to be far more impressive than that created by demonstrations laid out on small plots. Increasingly greater emphasis should, therefore, be put on laying out area-wide demonstrations, while planning farm demonstrations and field trials for advanced package of practices in the future programme of work.

**24.31 Information and Education:** Establishment of the information units provided for in the original plan for the IADP was delayed for many months. However, these units, whose function is to multiply the educational efforts of the subject-matter specialists and to carry on a continuing programme to inform cultivators of the various elements of the IADP, are now staffed and functioning with reasonable effectiveness. Providing these units with offset presses has given them the means for rapid communication of locally adapted information to the farmers in the districts concerned. They have also supported the educational part of the programme through increasing cooperation with the press and radio.

*Availability of inputs and adoption of improved practices*

**24.32** Inspite of shortcomings in the preliminary arrangements and in the establishment of supporting institutions, a remarkable achievement of the IADP has been the sharp increase in the demand by the farmers for purchased inputs like chemical fertilizers and improved seeds and to some extent, in certain areas for insecticides, pesticides and improved implements as well.

**24.33 Fertilizers:** The quantity of fertilizers distributed per block increased from 540 tonnes in 1961-62 to 2130 tonnes during 1964-65 for the first group of seven IADP districts, whereas the increase in the corresponding seven States (excluding IADP districts) was from 245 tonnes in 1961-62 to only 660 tonnes during 1964-65. This indicates that the fertilizer use per block has moved much ahead in IADP districts compared to its use in the non-IADP districts in the corresponding States, the rate of increase of fertilizer consumption in the first group of seven IADP districts being roughly 2½ to 3 times that of non-IADP districts. Part of this was, no doubt, due to relatively larger allocations made to these districts but the bulk was on account of the larger demand built up. The total distribution of nitrogenous fertilizers (in terms of ammonium sulphate) increased from 89,000 tonnes in 1961-62 to 1,96,000 tonnes in 1964-65 in the first group of seven districts and from 67,000 tonnes in 1962-63 to 1,08,000 tonnes in 1964-65 in the second group of eight districts. Although there has been substantial increase in the consumption of fertilizers in most of the districts during the period of the programme, the actual rates at which the fertilizers are applied by the farmers are still considerably below the recommended rates as is evident from Table 24.2. The low rates of application of fertilizers might be due to various reasons such as inadequate and untimely supply of fertilizers, lack of assured irrigation, poor education of the farmers in its use, etc. The actual cause operating in a particular district needs investigation.

**24.34** Since chemical fertilizer is the most important input item for increasing crop production, much greater efforts will be needed in the

Table : 24.2  
*Average rate of application of nitrogenous and phosphatic fertilizers for the principal crops during 1964-65*

District	Crop	Recommended dose (kg/hect.)		Average rate of application as percentage of the recommended dose		Percentage area benefited by	
		Nitrogenous (in terms of ammonium sulphate)	Phosphatic (in terms of super phosphate)	Nitrogenous fertilizer	Phosphatic fertilizer	Nitrogenous fertilizer	Phosphatic fertilizer
1	2	3	4	5	6	7	8
Thanjavur	Rice— <i>Jumai</i>	168	168	72	72	66	42
	Rice— <i>samba</i>	168	168	60	92	42	30
	Rice— <i>thaladi</i>	168	168	80	104	68	41
West Godavari	Rice—first crop	112	210	107	84	53	15
	Rice—second crop	224	210	71	101	84	62
Raipur	Rice	112	138	65	51	29	18
	Wheat	161	74	45	57	34	17
Aligarh	Maize	247	99	31	41	53	9
	Wheat	247	123	62	84	91	45
Ludhiana	Maize	272	222	54	54	69	19
	Wheat	224	224	51	46	5	2
Pali	Maize	224	224	49	64	6	4
	Rice	240	240	19	15	63	37
Shahabad	Wheat	220	204	33	32	60	49

*Note:* 1. All the figures are provisional.

2. The recommended rates of fertilizers have been evolved on the basis of the experimental evidence and experience available in the district. The recommended rates for districts given in the table are obtained by averaging the rates recommended for individual blocks.

latter districts to saturate the crop area with the application of fertilizers at recommended rates. It may be seen from the table below that only a small fraction of the potential requirement of fertilizer in most of the districts has been met by the programme so far.

Table : 24.3

*Consumption of nitrogenous fertilizers for wheat and rice (expressed as per cent of the quantity required for saturation of the entire area under the crop at the recommended rates)*

Crop : Rice			Crop : Wheat		
District	1961-62	1964-65	District	1961-62	1964-65
Thanjavur	18	45	Ludhiana	25	66
West Godavari	31	63	Aligarh	4	24
Raipur	14	20	Pali	1	7
Shahabad	14	14	Shahabad	5	18

24.35 The progress in the consumption of fertilizers would have been, in fact, appreciably higher in most of the IADP districts but for the overall shortage of fertilizers which the country faced. Whatever supplies of fertilizers could be made available by Government for the IADP districts have generally moved well in most of the districts. But whenever there was an overall shortage in the supply of fertilizers and the allotments fell very much short of demand, this had an inhibiting effect on the programme. The maintenance of the quality of the fertilizers also proved to be a problem under these circumstances. It may be noted that, contrary to the apprehension expressed by certain people, assessment surveys have shown that nearly 80 per cent of the fertilizer supplied in IADP districts have been used by the farmers for foodgrain crops. Among foodgrains, on rice alone, in the rice growing districts, 60 to 70 per cent of the available fertilizers has been applied. This has been possible largely as a result of the farm planning approach.

24.36 *Improved Seed* : The quantity of improved seeds distributed has increased to some extent but it has not made sufficient progress except perhaps for wheat in Ludhiana and Aligarh and for rice in West Godavari, Thanjavur and Mandya districts, as may be seen from Table 24.4. The quality of seed has not always been upto the mark, although the seeds supplied by the official agencies have proved generally superior to those supplied by the non-official agencies. It may be mentioned that the new high-yielding varieties, except hybrid maize, have not yet become available in the districts to any significant extent.

24.37 The problems connected with the production and distribution of quality seeds are well-known and the IADP districts do not differ in this respect from the rest of the country. A beginning has, however, been made

Table : 24.4

*Percentage area under wheat and rice benefited by improved seeds during 1964-65*

Group I Districts		Group II Districts	
District	%area	District	%area
<i>Wheat</i>			
Ludhiana	96	Mandya	64
Aligarh	63	Surat	37
Shahabad	26	Palghat	27
Pali	17	Alleppey	26
<i>Rice</i>			
Thanjavur	53	Sambalpur	13
West Godavari	60	Cachar	8
Shahabad	21	Burdwan	6
Raipur	10	Bhandara	2

in these districts to produce quality seeds at various stages under the supervision of technically qualified staff especially appointed for this purpose. The drying of seed and its proper storage during warm and highly humid periods have been presenting problems, especially in IADP districts of the South. Seed-processing plants of modern type are being installed in a few IADP districts. They will provide the experience needed to solve the difficulty in supplying high-quality seeds, regardless of weather hazards. The introduction of some new high-yielding varieties of rice, wheat, maize, jowar and bajra, which are responsive to high doses of fertilizer, is expected to open up new possibilities for exploiting the genetic potential of improved seeds. It will, however, call for a sound programme of seed multiplication for these new varieties to meet the very large potential requirement.

24.38 The IADP experience shows that the block seed farms, as part of the seed improvement programme, are not doing the job. They seem to need almost a complete administrative overhaul. Since the intensive districts have a qualified Seed Development Officer on staff, it may be desirable that the control of the block seed farms may be passed on to Project Officers. The State, no doubt, could and should continue to have charge of overall policy in relation to the total seed development effort. But the State is too distant to have effective charge of the local seed farms. One of the major weaknesses of these seed farms is the lack of managerial control including budgetary control within the district and this points to a clear need for improving their operations. With district responsibility should go accountability as a matter of course. In expanding quality-seed

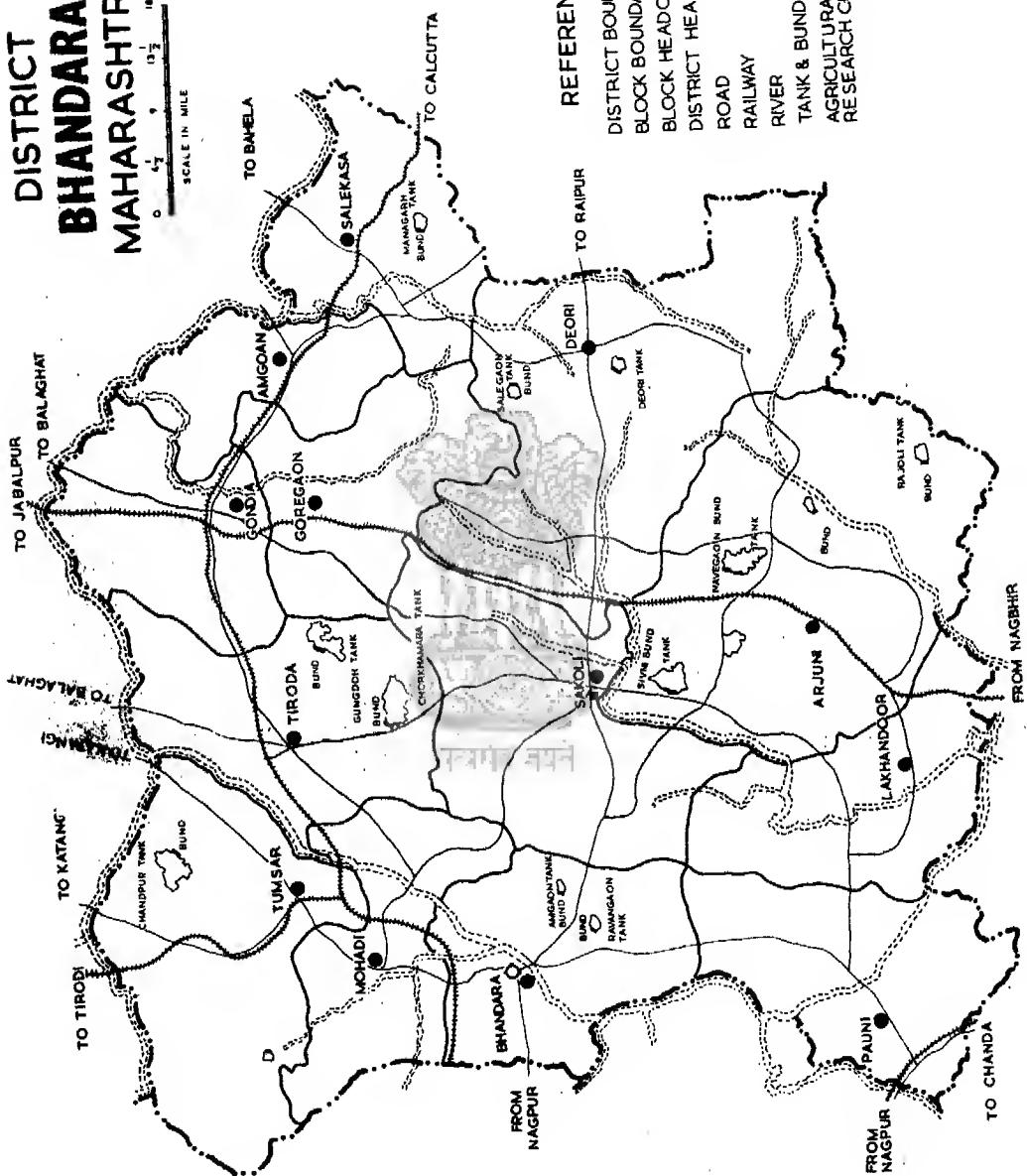
needs of a rapidly moving agriculture, getting these farms in gear calls for very urgent attention wherever this has not already been done.

**24.39 Improved Implements:** Popularisation of improved implements is a key element of the IAD Programme which provides for one well-equipped workshop for each IADP district with a view to popularising, demonstrating and manufacturing improved implements. The progress in setting up these workshops was very slow until 1963-64. But progress has been better since then. The present position is that a modern workshop, the nerve-centre for the district programme of extension-training and development and servicing of IADP equipment, was designed, built and equipped in thirteen of the fifteen districts. Twelve districts followed the model plan with appropriate modifications suited to their local needs. An Agricultural Implements & Power Development Centre was established at the Allahabad Agricultural Institute. Its objective is to develop, test and release blue-prints and specifications to interested manufacturers. The problem areas defined as most important to IADP are : (1) increasing power for agricultural operations; (2) precision placement of seed and fertilizer; and (3) mechanical harvesting. A small tractor evaluation project was initiated at the Allahabad Centre to determine the physical and economic performance of selected small tractors (5-15 HP) under local conditions in IADP districts. The Centre also developed a one-row planter. Eighteen trials in Pali, Ludhiana, Aligarh, Shahabad and Sambalpur during kharif 1965 gave an increase in average yield of 40 per cent for maize and a 36 per cent reduction in planting time, compared with conventional methods. Considerable progress has been made in Thanjavur district towards developing a machine to hand-place fertilizer in the puddle for paddy. Although still experimental, eight trials gave 23 per cent increase in yield over the conventional broadcast method. However, with the delay in appointment of staff, procurement of equipment, construction of workshop buildings, supply of materials, etc., the implements programme in the IADP districts has yet to reach a stage where it can produce a real impact.

**24.40 Soil Testing :** Provision of soil testing laboratories was another key element of IADP. Progress was again very slow until 1963-64 when these were set up in the first group of 7 districts. Of the second group of 8 districts, only three have such laboratories so far. A total number of 2.98 lakh soil samples have been collected from the IADP districts but only 1.83 lakhs have been analysed and used for fertilizer recommendations. There is considerable delay between the collection of samples and making fertilizer recommendations on their basis.

**24.41 Irrigation:** Although one important consideration in the selection of IADP districts was the availability of adequate irrigation facilities, it has been observed that the intensity of irrigation differs greatly from district to district as can be seen from Table 24.5.

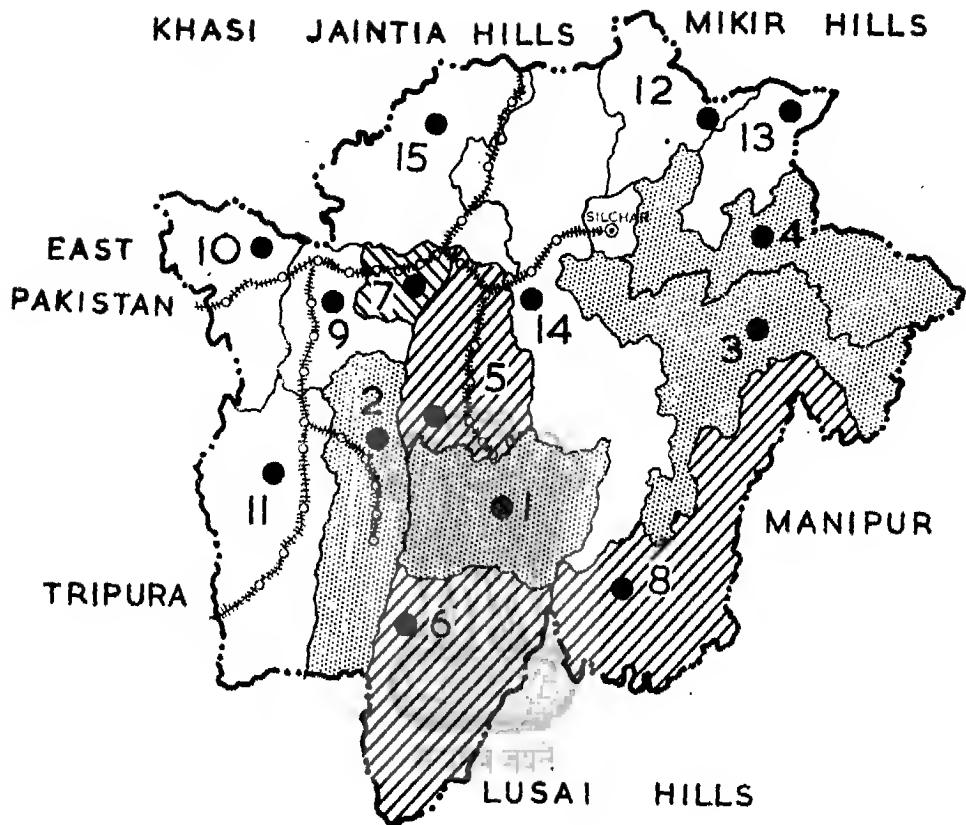
# DISTRICT BHANDARA MAHARASHTRA



## REFERENCES

- DISTRICT BOUNDARY
- BLOCK BOUNDARY
- BLOCK HEADQUARTER ●
- DISTRICT HEADQUARTER ○
- ROAD
- RAILWAY
- RIVER
- TANK & BUND
- AGRICULTURAL RESEARCH CENTRE

DISTRICT  
CACHAR  
ASSAM



BLOCK HEADQUARTER ..... ●

■ WORKING BLOCKS (FROM 1963)

- 1 LALA
- 2 RAMKRISHNA NAGAR
- 3 SONAI
- 4 LAKHIMPUR

■ PROPOSED BLOCKS

- 5 HAILAKANDI
- 6 KATLICHARRA
- 7 BADARPUR
- 8 NARSINGPUR

□ NON-PACKAGE BLOCKS

- 9 SOUTH KARIMGANG
- 10 NORTH KARIMGANG
- 11 PATHARKANDI
- 12 UDHARBAND
- 13 RAJABAZAR
- 14 SALCHAPRA
- 15 KATIGARHA

Table : 24.5  
*Area under irrigation—Group I Districts*

District	Gross area irrigated as per cent of gross cropped area	
	Before Programme*	1963-64
Aligarh	43.4	50.2 **
Ludhiana	57.5	62.7
Pali	23.3	22.1 **
Raipur	12.0	14.4
Shahabad	44.5	46.9
Thanjavur	80.3	79.9 **
West Godavari	76.2	76.2

\* Average of 1957-58 to 1959-60 for Shahabad, Thanjavur and West Godavari; and average of 1958-59 to 1960-61 for Aligarh, Ludhiana, Pali and Raipur.

\*\* Figures are for 1962-63

No significant increase in irrigated area has been made in these districts, except in Ludhiana, during the period. Ludhiana has recorded the largest increase in irrigation as compared to that in the pre-package period. In Raipur and Pali, the irrigated area is almost static. As better irrigation facilities are a pre-requisite for more intensive use of fertilizers and improved seeds, especially of high-yielding varieties, there is an urgent need for increasing the irrigation facilities through minor works as has been done in Ludhiana. For this purpose, steps should be taken to earmark adequate funds for minor irrigation in IADP districts especially as rainfall is uncertain in most of them.

**24.42 Water Use and Management:** Efficient and timely use of the available water, in accordance with the soil conditions and crop requirements is another important factor on which available scientific information is scanty. These aspects need to be emphasised much more in the future programme of work. It has been found that large areas in most IADP districts are affected by one or more problems relating to soil acidity, salinity and alkalinity, drainage, water-logging and floods. Inspite of the shortage of water, it has been experienced that irrigation potential is not utilized fully and efficiently. There is a need to stop the wastage of water from the canals as well as by the farmers in their fields. Unless adequate steps are taken to control these hazards, profitable agricultural production would not be possible even if inputs like fertilizers, improved seeds and pesticides are made available. These considerations underline the importance of having the "package of practices" being matched by a "package of works" recommended earlier.

**24.43 Plant Protection Measures :** The plant protection work recorded some progress in IADP areas *pari passu* with the increased use of fertilizers. The total area treated for pests and diseases increased from 2.46 lakh hectares in 1961-62 to 8.20 lakh hectares in 1964-65 in the first group of 7 districts and from 1.28 lakh hectares in 1962-63 to 2.86 lakh hectares in 1964-65 in the second group of 8 districts. The increase in the use of insecticides has been mainly accounted for by the IADP districts in the South and still represents only a small fraction of the total cropped area in these districts. Some of the factors which have stood against faster progress are: inadequacy of trained staff, lack of availability of power sprayers and insecticides for undertaking area-wide operations and reluctance on the part of the cultivators to take up prophylactic measures as a part of their farming operations. Inadequacy of research facilities has also proved a handicap. For instance, in Shahabad district, failure to find a timely remedy for the heavy paddy damage due to unknown factors led to substantial set-back to the programme during 1963-64. Increasing need has been felt in the IADP districts for greater attention to the problem of production and use of plant protection materials especially in view of the positive association that has been observed between increased use of fertilizers and increased incidence of crop-pests.

**24.44 Farmer-participation:** Increases in the use of these inputs clearly indicate that the programme has made considerable progress during the period. Another useful guide to the impact made by the IADP is the extent of farmer-participation. The increase in farmer-participation per block from year to year in the two sets of IADP districts is given in Table 24.6.

Table 24.6  
*Average farmer-participation per block*

Group I districts	Group II districts
1961-62	1,835
1962-63	3,195
1963-64	4,430
1964-65	4,800
	1962-63      1,715
	1963-64      2,650
	1964-65      3,215

24.45 IADP districts average about 9,535 farmers per block and about 5,700 farmers with holdings of a hectare or more in size. The involvement of farmers has been commendable, especially in view of the newness of the programme, the lack of experienced staff in the earlier years and the wide range of difficulties encountered. What is important is to learn about the rate of progress actually achieved, in view of the actual situation that existed, as a basis for estimating how to proceed in the future and the rate of progress to be expected. The main lesson is that IADP has been able, in a relatively short time, to reach such a large number of farmers. In assessing the results of the IADP, one should also keep in view the "spread-effect" that it obviously has had in neighbouring areas, although it may be difficult to

measure it in physical terms. In the first group of seven districts, the coverage of the gross cropped area by the farm plans increased from 13 per cent in 1961-62 to 40 per cent in 1964-65. Largest coverage of area (nearly 84 per cent) was in the district of West Godavari and the lowest coverage (22 per cent) was in the district of Raipur. The coverage of area in the second group of eight districts in 1964-65 was 23 per cent of the total gross cropped area.

#### *Increase in Production*

24.46 An obvious indicator of the progress made by the IADP district is the increase in production in these districts, relatively to the adjoining districts and to the rest of the State excluding the IADP districts. Total production of principal foodgrain crops has increased considerably in these districts, during the period of the operation of the programme. Table 24.7 gives the average annual production of major foodgrain crops during the period of operation of the programme expressed as per cent of the average production during the pre-package period for the IADP districts and the comparable areas.

24.47 The increase in agricultural production in most of the districts has considerably contributed to the income of agricultural population in the IADP districts. It can be seen from the Table 24.8 that the value of the additional output of major crops over the level of the pre-package period is substantial in most of the districts. Among the first group of districts, the increase in Ludhiana has been the largest, closely followed by Aligarh. Among the second group of districts, Mandya has registered a steady and substantial increase. A comparison of the figures of value of additional output given in Table 24.8 and of expenditure given in Annexure XIV for the IADP districts in respect of the years 1961-62 to 1964-65 will indicate that the benefit-cost ratio has been, on the average, very much in favour of the programme inspite of the various handicaps that it has suffered from.

24.48 Increase in production can be due both to increase in area under foodgrains and increase in yield rates. The latter is particularly significant in the context of the IADP. The yield rates for the principal crops in different years for the IADP districts are given in Table 24.9. A study of this table indicates that the increases in production are generally associated with increases in yield rates. Among the first group of 7 districts, increase in yield rates of wheat during 1964-65 for Aligarh and Ludhiana, where wheat is the principal crop, has been respectively of the order of 55 per cent and 95 per cent over those in the pre-package period. Among the second group of 8 districts, Mandya has shown the largest increase, namely 64 per cent, in the yield rate of its principal crop, rice, in 1964-65, compared to that in the pre-package period, whereas in most of the other districts the yield rate has shown only moderate increases.

Table 24.7

*Average production of major foodgrain crops during the period of operation of the programme (expressed as percentage of the average production during the pre-package period) for the IADP districts and the comparable areas*

	Group I districts						
Thanjavur (Rice)	112	121	111	128	166	115	117
West Godavari (Rice)	112	106	90	101	100	103	111
Raipur (Rice)	114	120	94	98	102	103	94
Aligarh (Maize, bajra, wheat gram, barley and pea)							
Ludhiana (Maize, wheat and gram)							
Pali (Maize, jowar, bajra, wheat and barley)							
Shahabad (Rice, Wheat)							

## Group II districts

	Sambalpur (Rice)	Surat (Rice)	Mandya (Rice and jowar)	Alleppey (Rice and ragi)	Palghat (Rice)	Burdwan (Rice)	Bhandara (Rice and jowar)	Cachar (Rice)
IADP district	108	128	131	115	109	104	105	115
Adjoining districts	109	107	118	101	116	108	115	—
State excluding the IADP district	110	130	109	108	108	115	106	113

[Note: 1. In the case of first group of seven districts, the period of operation of programme is 1961-65; for the second group of districts it is 1962-65 for Sambalpur, Surat, Mandya, Alleppey and Palghat and 1963-65 for the districts of Burdwan, Bhandara and Cachar.

2. In the case of first group of seven districts, the pre-package period is 1958-61; for the second group of districts, it is 1959-62 for Sambalpur, Surat, Mandya, Alleppey and Palghat and 1960-63 for the districts of Burdwan, Bhandara and Cachar. For Shahabad district, the pre-package period has been taken as the year 1960-61.]

Table 24.8

*Value of total output (Rs. in lakhs) of major crops in IADP districts*

## (a) Group I districts

District	Crops included	Average					Average 1961-65
		1958-61	1961-62	1962-63	1963-64	1964-65	
Thanjavur West	Rice	5,202	6,143	5,509	5,366	6,347	5,841
Godavari	Rice	2,992	3,750	3,280	3,764	3,715	3,627
Shahabad	Rice, wheat & gram	2,025†	2,419	2,261	2,200	2,647	2,382
Raipur	Rice	2,393	2,606	2,115	2,936	2,984	2,660
Aligarh	Maize, bajra, wheat, barley, gram & pea	1,131	1,303	1,507	1,280	1,723	1,454
Ludhiana	Maize, wheat, gram, cotton & groundnut	1,061	1,581	1,402	2,124	2,342	1,862
Pali	Maize, bajra, jowar, wheat & barley	549	888	585	383	679	634
Total		15,353	18,690	16,659	18,053	20,437	18,460

## (b) Group II districts

District	Crops included	Average					Average
		1959-62	1962-63	1963-64	1964-65		
Surat	Rice, jowar & cotton (lint)	1,614	2,039	1,958	1,942		1,980
Mandya	Rice, ragi & sugarcane	1,251	1,559	1,575	1,745		1,626
Alleppey	Rice	628	675	645	674		665
Palghat	Rice	1,751	1,764	1,954	2,023		1,914
Bhandara	Rice, wheat & jowar	879**	*	891	957		924
Sambalpur	Rice	1,767	1,470	2,055	2,190		1,905
Burdwan	Rice	3,405**	*	3,600	3,461		3,530
Cachar	Rice	1,157**	*	1,232	1,437		1,334
Total		12,452	7,507††	13,910	14,429		13,878

†Figures relate to 1960-61 only.

\* Programme started in the year 1963-64.

\*\* Average for 3 years 1960-63.

†† Total not comparable as it includes only 5 out of 8 districts.

Note—The value of production was calculated, using the State harvest prices for 1960-61 except for Sambalpur district where 1959-60 State harvest prices were used.

Table 24.9  
*Average yield in quintals per hectare of major foodgrains*

## (a) Group I districts

District	Crop	Before IADP		After introducing IADP				Average 1961-65
		Average 1958-61	1961-62	1962-63	1963-64	1964-65		
Thanjavur	Rice	15.0	17.0	15.2	14.8	17.3	16.1	
West Godavari	Rice	13.6	16.5	14.8	16.3	16.1	15.9	
Shahabad	Rice	10.8*	12.9	11.8	11.2	13.1	12.2	
	Wheat	7.2*	6.8	7.0	6.8	7.4	7.0	
Raipur	Rice	9.1	9.8	7.9	10.9	11.0	9.9	
Aligarh	Wheat	10.3	12.0	11.9	11.0	16.0	12.7	
	Maize	4.3	5.0	13.4	6.5	8.2	8.2	
Ludhiana	Wheat	11.6	17.6	17.5	20.6	22.6	19.3	
	Maize	13.8	20.1	11.4	20.2	14.4	16.7	
Pali	Wheat	8.7	10.4	9.4	8.1	10.2	9.5	
	Maize	7.6	9.7	9.1	6.6	7.8	8.3	

\* Pertains to the year 1960-61.

## (b) Group II districts

District	Crop	Before IADP		After introducing IADP				Average 1962-65	
		Average 1959-62	1961-62	1962-63	1963-64	1964-65			
Sambalpur	Rice	9.3		7.2	10.7	11.0	9.6		
Surat	Rice	11.8		11.8	13.4	13.4	12.9		
Mandya	Rice	14.9		22.1	21.3	24.1	22.5		
Alleppey	Rice	14.1		14.3	13.7	14.4	14.1		
Palghat	Rice	15.8		15.5	17.1	17.8	16.8		
		Average 1960-63		Average 1963-64 1964-65 1963-65					
Burdwan	Rice	14.3			18.3	17.6	18.0		
Bhandara	Rice	9.4			9.8	9.9	9.8		
	Wheat	4.3			3.1	4.4	3.8		
Cachar	Rice	10.8			11.1	12.5	11.8		

(Note: The yield of rice refers to milled rice.)

24.49 The trend in the yield rates is somewhat vitiated by the seasonal fluctuations especially when the period is short. There have been considerable fluctuations in yield rates from year to year and the weather has affected different areas differently. In areas of assured irrigation, the fluctuations in yield rates have been of a much lower order than those in other areas with no such assured irrigation. Also the yield rates of kharif crops, which mainly depend upon rainfall for their normal growth, particularly in Northern India, have shown much wider fluctuation. This makes it imperative to study the trend in yield rates adjusted for normal development activity and seasonal effects. Adjustments in the yield rates have been made through the technique of analysis of covariance, using the corresponding yield rates in the comparable areas. Increasing trends in yield rates of wheat in the districts of Ludhiana and Aligarh become more obvious when adjusted, as can be seen from Table 24.10.

Table 24.10  
*Yield rate (in quintals per hectare) after adjustment—Group I Districts*

Crop	Thanjavur			West Godavari		Shahabad		Raipur	Aligarh		Ludhiana		Pali
	Rice	Rice 1st crop	Rice 2nd crop	Rice	Wheat	Rice	Maize	Wheat	Maize	Wheat	Maize	Wheat	Wheat
	1	2	3	4	5	6	7	8	9	10	11	12	13
1961-62	16.9	15.7	15.7	—	—	9.9	7.4	11.6	17.8	17.7	9.8	10.0	
1962-63	14.9	14.1	17.7	12.6	7.3	9.5	8.8	12.1	14.0	19.2	9.1	8.9	
1963-64	15.1	17.0	16.2	11.5	7.1	9.4	8.7	12.1	18.1	21.3	6.6	9.0	
1964-65	17.6	16.4	16.6	12.5	7.1	11.1	8.1	15.3	17.2	20.3	7.9	10.6	

24.50 The impact of the programme for each one of the technical inputs cannot be calculated separately from these surveys as the increase in the yield is a result of the combined effect of all the inputs together. However, a rough idea of the impact of a given input like fertilizer or improved seed can be obtained by studying the difference between the yields of the plots treated with a particular input and of those not receiving that input, assuming the effect of other factors as constant. Additional yield obtained with the application of fertilizers is given in Table 24.11.

Table 24.11

*The additional yield in quintals per hectare with the application of fertilizers (at a rate of 22.4 kg. of nitrogen per hectare).*

Group I districts				Group II districts			
Crop : Wheat		Crop : Rice		Crop : Rice			
District	Additional Yield	District	Additional Yield	District	Additional Yield		
Ludhiana	3.8	Thanjavur	(kuruvai)	1.8	Sambalpur	3.2	
Aligarh	5.4		(samba)	1.3	Mandyā	4.5	
Shahabad	5.9		(thaladi)	3.4	Alleppey	3.1	
Pali	2.8	W. Goda- vari	(1st crop)	1.9		(mundakan)	6.3
			(2nd crop)	2.9		(punja)	1.4
		Shahabad		5.9	Palghat	4.9	
		Raipur		4.2		(mundakan)	5.1
		Surat		3.5	Bhandara	5.0	

It may be seen that there is considerable variation in the response to fertilizers from district to district and it clearly shows the areas where fertilizer can be most economically used and its application propagated for increased production and better return to the farmers. In order to have further impact of fertilizers on production in such districts, it will be necessary to introduce high-yielding varieties which are also highly responsive to fertilizers. Reasons for the low response to fertilizer in Thanjavur are under investigation. As regards the impact of improved seeds, as mentioned earlier, there had not been any appreciable increase in yield mainly for the reason that the quality of improved seeds was not upto the mark.

24.51 Impact of adoption of improved methods of cultivation on yield may be studied more usefully by comparing the yield rates of crops obtained by participant and non-participant farmers. It has been observed from the crop-cutting surveys that the yield rates of different crops obtained by the participant farmers in different years are consistently higher than those obtained by the non-participants. But the differences in many of the districts are of higher order in the initial years but narrow down later. This could be explained by the fact that in the initial years relatively more progressive farmers came forward to adopt improved methods of cultivation.

#### *Research and Operational Studies*

24.52 Experience of the last 4 years has shown that the success of the IADP depends, to a very large extent, on the support which agricultural

research can lend to the field programme in order to ensure that the recommendations made by the extension staff to the farmers are applicable in a most effective manner to local conditions and problems which usually show tremendous variation from farm to farm. New situations and problems keep on arising with changing agriculture. For example, greater use of fertilizer will call for better weed control measures because of the stimulus which higher soil fertility will provide to the growth of weeds. Also, pests and diseases are known to become greater problems with the use of fertilizers on account of the more luxuriant growth of plants induced thereby. There will be need for change-over from older varieties to newer varieties which possess better resistance to particular pests and diseases besides being more responsive to fertilizer application. In cereals, like wheat and rice, higher fertilizer use may not be profitable beyond a certain level of increased yield unless the crop can stand higher and more profitable doses of fertilizers without suffering from lodging. Greater intensity of farming will require time-saving and expeditious operations involving the use of improved implements and mechanical devices. Thus, researches covering a number of fields become necessary if the programme has to move from a stagnant agriculture to a dynamic agriculture. Realization of these needs has resulted in the research institutions in the different States becoming increasingly involved in identifying and handling the research problems of the IADP districts.

24.53 Operational studies and feed-back of the results, with a view to ensuring continuous improvement of the programme, was an important element of the IADP concept. Here too, there was considerable delay in making the necessary arrangements. In the earlier years, the attention of the concerned authorities was concentrated on the collection of basic statistics and operational and analytical studies did not get the recognition that they deserved. The operational research units which had undertaken these studies have been sanctioned for all the first group of seven districts. Studies of short-term nature, extending over a period of 2 to 3 months were conducted on the problems thrown up in the course of the implementation of the programme. As many as 23 studies have been completed in the districts of Ludhiana, Raipur, West Godavari and Aligarh. Brief summaries of their findings have been given in Chapter IX of the Report. These studies cover subjects like preparation of farm plans, crop demonstration, requirement of storage godowns, role of cooperatives, etc. Apart from these operational studies, it was felt that it would be appropriate to undertake some analytical studies covering more fundamental aspects of the programme. These studies were entrusted to the Agro-Economic Research Centres and 6 studies were completed by these Centres. The subjects covered in these studies related to adoption of improved practices, supply of improved inputs, crop demonstration, etc. The findings of both the types of studies have been taken into account by the staff operating the

programme and also by the Fifth Central Conference of Key Personnel when they discussed the problems and the bottlenecks regarding the progress of IADP. The utility of these studies, however, could be enhanced if due attention was given to the implementation of the findings by the staff engaged at the field level. It would be necessary to set up operational research units with adequate and trained personnel in the second set of districts as well.

#### *CONCLUSION*

24.54 As mentioned earlier, the IADP is in the nature of an experiment and both positive and negative results can be expected from such a programme. The progress of the programme regarding preliminary arrangements, establishment of institutions, supply of inputs and their utilization and growth of agricultural production have been presented in the earlier sections. Here we enumerate some of the general conclusions and the lessons to be drawn from them. The first one is that the basic concept of the programme has proved to be essentially sound. The three desirable requirements for the successful implementation of the concept are that (i) areas should be selected carefully in the light of their potential for rapid development with only relatively minor changes in the physical infra-structure—in case major change in the infra-structure is needed, the IADP should not be taken up in that area until a programme for such change had been first successfully implemented; (ii) the basic approach should be one of carefully selected package of related practices supplemented by such minor works as may be necessary; and (iii) the programme should aim at putting in a sufficiently intensive effort within a certain period so that there is a really effective impact on the situation and adequate resources for the purpose should be assured from the beginning.

24.55 Secondly, the IADP has established beyond doubt that the Indian farmer, inspite of his illiteracy and poverty, is not unintelligent or unduly tradition-bound. His poverty, no doubt, makes him somewhat cautious in accepting an innovation which involves risk; but once he is convinced through extension effort, especially through demonstration, that a particular innovation is both useful and within his means, he is as prompt as farmers in any other part of the world to accept it. The quick adoption that a substantial number of Indian farmers have made, in the IADP as well as in certain other areas, of new fertilizers, pesticides, seeds, implements and farming practices, is indeed one of the most encouraging features of the Indian agricultural scene. In fact, what is holding up progress in the IADP areas today is not so much the lack of demand from the farmers but the lack of supply of essential inputs. One lesson of the IADP experiment is that it is not so much Indian agriculture which has failed the economy but it is Indian industry which has failed to supply the wherewithal which Indian agriculture has been demanding. It has also

proved that any programme for modernizing agriculture cannot be carried out in isolation. There has to be a corresponding progress in the field of industries supplying the needs of agriculture and processing the produce of it.

24.56 Thirdly, the IADP has proved that the small farmer can be no less progressive than the big farmer, especially where the adoption of improved practices is concerned and that the sort of technological progress (especially in respect of chemical and biological, if not mechanical, innovations) which has been possible in the small farms of certain other countries can also be achieved in the small farms of India provided the requisite pre-conditions for agricultural development are created. In fact, there are several areas within certain IADP districts where the increase in production will compare favourably with the record of areas of similar size in most other countries. If, however, the average is lower, the reason is that there are certain basic difficulties in the Indian situation which are beyond the means of the IADP by itself to correct and which require policy decisions of a basic character, administrative reforms which are fundamental and executive actions which affect a number of sectors outside the IADP.

24.57 On the other hand, one of the important lessons that one can draw from the implementation of the IADP is that the administrative system is not adequate for the job and has to be geared to the needs of the programme. In fact, one of the most serious obstacles that the IADP has had to face is the archaic administrative system that obtains in the country. This system, based essentially on checks and balances, evolved in a different time and for a different purpose, has proved woefully inadequate for any operation, the aim of which is not to maintain the *status quo* but to change it. The IADP has thus been a square peg in a round hole. The main objective of the IADP is to accelerate the rate of growth by bringing about a basic change in the situation in which it operates. The main purpose of the administrative system that India has inherited is, on the other hand, to ensure security and hence allow only the minimum possible change. The IADP puts a premium on the technician who is the harbinger of change. The Indian administrative system gives primacy to the administrator whose main function is to lay down and administer the rules designed to ensure conformity. The basic idea of IADP is that it should be a tailor-made programme to suit the needs of a particular area which can be adjusted by the local authorities promptly and effectively, as and when the situation changes. The main concern of the Indian administrative system has been to lay down general patterns of conformity to which the areas must adjust rather than otherwise and leave the least possible discretion to the authorities lower down in the hierarchical structure.

24.58 Another lesson one can draw from the programme is that the

Government's basic policy regarding credit, marketing, prices, industries, import, investment and land are not conducive to the full realization of the benefits of this impact-programme. These require considerable modifications for the successful implementation of such a programme. An essential condition for the success of the IADP is that adequate credit should be available to the farmer promptly, almost on tap. But this has not yet been assured to him largely because of the inability on the part of the authorities to provide an effective alternative to co-operative system in areas where it is weak. The progress of neither co-operative marketing nor State-trading has been such as to provide the facilities that the farmer requires. At the same time, in most of the rural areas, private trade has not developed that competitive efficiency as could be relied upon to provide satisfactory marketing service to the farmers. Again, it is a *sine qua non* for a programme of this kind that the farmer should be assured of a minimum price so that when he steps up his production at the cost of extra effort, he may not be faced with such a decline in price that bulk of the fruits of his additional effort is lost to him. This was, however, not assured to the Indian farmer until 1964-65 and even now there are quite a few lacunae in the price policy. Further, the farmer is not able to get all the fertilizers, pesticides and implements that he requires, partly because these industries have not yet been sufficiently developed in the country and partly because on account of foreign exchange shortage they cannot be imported from abroad. The investment policy in the agricultural sector itself has also been such that where a "package of practices" in order to yield optimum results requires to be accompanied by a corresponding "package of works", funds available for investment in such works have often been less than adequate. The pressure to develop other areas to meet the urgent food requirements of the country leads also to a diversion of key materials and trained personnel to these areas, especially the Intensive Agricultural Areas (IAA), and this leaves less resources than originally planned for the IADP areas. Also under the IADP, resource additions that require large capital investments and take time to mature e.g., irrigation, drainage, land reclamation, etc. are expected to be dealt with in the normal manner. The working of the programme, however, has brought into sharper focus the requirements of specific investments of this kind, particularly in the medium-term field. As was mentioned in the First Evaluation Report, the short-term investment itself gets accelerated and begins to yield better results after medium and long-term improvements have been carried out. The experience in the IADP districts, where attention has so far been paid mainly to short-term investments by way of seeds, fertilisers, pesticides, etc., has shown that there is a pressing need for complementary medium-term investments. Thus, the hard core of the programme may have increasingly to include measures for building up production-resources of more than purely short-term character. The

allocations for agricultural work of at least medium, if not long, term character should, therefore, be progressively fitted into the programme and taken up on a high priority basis. The trend of land reforms has not also been such as to inspire confidence in the minds of the farmers. It is not so much that a particular pattern of land reform is an essential prerequisite for increasing agricultural production. For instance, in West Godavari, where the land reform situation is not very satisfactory, the achievements of the IADP have not been bad. What is needed, however, is that a reasonable assurance regarding satisfactory tenant land-owner relationship and reasonable size of holdings should be forthcoming on a long-term basis and the prevailing uncertainty about land policy should be removed so that the tenant is able to get requisite production loans and the land owner is induced to invest in land development works.

24.59 Another lesson is in regard to the extension of the programme to other areas. As different areas are at different stages of development, the nature of the package programme should be adjusted to these stages. Broadly, the agricultural development programme in the country may be considered as comprising a three-tier system of a dynamic type in which each tier is constantly trying to move from a lower to a higher level of technology but the main burden of innovation is taken by the first tier. In other words, the vanguard comprises of the IADP districts which serve as the "path-finder" and "pace-setter". In the middle, there are the IAA districts in other areas of the country having a potential for rapid development, subject to the limitations imposed by available resources. In the rear follow all the other parts of the country which are covered by normal agricultural development programmes applied on a relatively thin basis, primarily as a result of the overall paucity of technical personnel and material resources. As more resources become available for agricultural development, all these three are progressively intensified and all the three move continuously, sometimes the difference between them becoming smaller and sometimes larger, depending on the success achieved by the vanguard in over-coming the obstacles and the progress made by those which are following it one or more stages behind.

24.60 However, extension to other areas, even on this broad plan, should be undertaken only if key materials and trained staff can be fully assured without affecting the existing IADP districts. Fewer intensive districts with an assurance of success are certainly better than a larger number without such assurance. Advance action regarding the supply of trained staff and key materials, therefore, is of the highest importance as it is the supply of these which sets a limit to the increase in the number of IAA districts. If, on account of unforeseen circumstances, the supply of trained staff and key materials falls short of the overall requirements, care should be taken that at least the IADP districts, which comprise the first

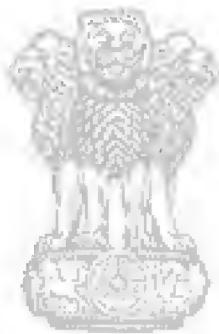
tier of "path-finders" and "pace-setters" are not adversely affected thereby. Otherwise, the programme for the modernisation of the country's agriculture will receive a set-back from which it will take many years to recover. So long as the overall shortage of key inputs like chemical fertilizers, hybrid seeds and modern pesticides continues, the needs of the IADP, which is a "path-finder" programme, merit first priority followed by that of IAA districts. It is only after meeting the requirements of these districts that supplies to the rest of the districts should be considered. The adverse effect of the shortfall of these inputs should be made up by making a more intensive use of other inputs e.g. organic and green manures, good quality seeds, indigenous plant protection materials, etc., besides minor irrigation and soil conservation.

24.61 Reasonably encouraging as has been the progress of the IADP in the various districts, on the whole, much remains to be done to attain a more rapid rate of agricultural development at the district level. The problem lies mainly in four areas : (i) providing a better overall economic climate to encourage farmers; (ii) strengthening and stabilising the staff situation in the district so that they can be more effective; (iii) ensuring adequate supplies of technical inputs and production credit and improving distribution policy and local management of irrigation water; and (iv) speeding up the development of high-yielding, disease-resistant crop varieties of all major crops. With these and related improvements, there is good evidence that the IAD Programme, as the vanguard of the three-tier system described earlier, is capable of moving agriculture ahead at the speed that is needed for the country to solve its food problem. That this is a mighty task should be evident from the review of difficulties and accomplishments to date. But the experience so far gained also shows that the problems are soluble and this should lend courage to policy makers and administrators.

24.62 It is, however, important to recognise at the same time that programmes of agricultural development such as the IADP involve, in the ultimate analysis, rather drastic changes in traditional thinking of a very large number of rural people who have to be motivated to adopt new and improved practices of crop production. These people usually operate as independent individuals and act according to the decisions which they themselves make. Experience of even advanced countries has shown that the processes of motivation of farmers and adoption by them of new ideas take several years before a sizeable number of farmers change over from traditional to new practices. Researches undertaken, for instance in the USA, on the factors which are important and the interval between the creation of the awareness of a new idea in a rural community and its acceptance by a majority of farmers, have brought out the fact that the interval varies considerably but that seven years may be taken as a fair

average. Experience of Japan is also similar. Considering the fact that in India the farmers do not possess the level of literacy prevalent in the advanced countries and do not enjoy the benefits of a well developed system of communications, it is obvious that the interval required for a large scale adoption of a new idea may be longer, especially when the programme has to be developed with the help of inadequate technical competence which itself requires 2 to 3 years to be effectively developed to be equal to the tasks involved. Such being the case, the full impact of the IADP to become sufficiently tangible is likely to take a much longer time than five years contemplated in the original formulation of the Programme.





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